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North Central Forest Experiment Station

Resource Bulletin **NC-136**

Forest Statistics for Iowa, 1990

Gary J. Brand and John T. Walkowiak

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This report includes the most commonly used Forest Inventory and Analysis statistics. Additional forest resource data can be provided to interested users. Persons requesting additional information that can be provided from the raw inventory data are expected to pay the retrieval costs. These costs range from less than $100 for a simple request to $2,000 for a complex retrieval involving the services of a Forest Inventory and Analysis computer programmer. Requests will be filled to minimize the impact on the Forest Inventory and Analysis Work Unit.

Requests for unpublished information may be directed to:

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Area served: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Wisconsin

We thank Caren Robey of Des Moines, Iowa, for the drawing on the front cover.

FOREWORD

Forest Inventory and Analysis is a continuing endeavor mandated by the Renewable Forest and Rangeland Resources Planning Act of 1974. Prior inventories were mandated by the McSweeney-McNary Forest Research Act of 1928. The objective of Forest Inventory and Analysis is to periodically inventory the Nation's forest land to determine its extent, condition, volume of timber, growth, and removals. Up-to-date resource information is essential to frame forest policies and programs. USDA Forest Service regional experiment stations are responsible for conducting these inventories and publishing summary reports for individual States. The North Central Forest Experiment Station is responsible for Forest Inventory and Analysis in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.

Field work for the Iowa forest inventory began in May 1989 and ended in February 1990. Reports of the two previous inventories of Iowa's timber resource are dated 1954 and 1974.

The USDA Agricultural Stabilization and Conservation Service provided aerial photos used in the Iowa Forest Inventory.

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HIGHLIGHTS

NOTE: *Comparisons of data from new forest inventories with data from earlier inventories indicate trends in forest resources. Comparisons are only valid if the procedures used in the two inventories are similar. Because of our ongoing efforts to improve the efficiency and reliability of the inventory, several changes in procedures and definitions have occurred since 1974. Some of these changes make it inappropriate to directly compare the 1990 data with those published for 1974. Therefore, data from the 1974 inventory have been reprocessed using the 1990 procedures and published in part in this report. Please refer to the section labeled "Comparing Iowa's Third Inventory With The Second Inventory" for more details.*

Gary J. Brand, Research Forester, received a bachelors degree in Chemical Engineering in 1971 and a masters of forestry degree in 1976 from the University of Minnesota. He joined the Modeling Unit at the North Central Forest Experiment Station in 1977. A detail to the Forest Inventory and Analysis Unit gave him the opportunity to work on the Iowa report.

John T. Walkowiak, Urban Forestry Coordinator, received a bachelors degree from State University of New York, College of Environmental Sciences and Forestry in 1978 and a masters degree in Forest Resources from the University of New Hampshire in 1984. After receiving forestry experience in New England, Nebraska, and Montana, he joined the Iowa Department of Natural Resources in 1989.

General

Although known today primarily as an agricultural State, Iowa had about 7 million acres of forest before European settlement. Agricultural clearing has dramatically reduced the area of forested land. In this report, the status of Iowa's forests and the changes since the last inventory are presented.

Iowa is divided along county boundaries into three geographical areas called the Northeastern Unit, Southeastern Unit, and Western Unit (fig. 1). White oak-red oak-hickory and maple-basswood are the most common forest types in the Northeastern Unit; white oak-red oak-hickory forests predominate in the Southeastern Unit; and elm-ash-soft maple forests cover the most area in the less densely forested Western Unit.

Forest Area

- Iowa had 2.1 million acres of forested land, or 5.7 percent of the State's total land area in 1990. The two eastern Survey Units had most of the forest land and had more of their landbase in forests than the Western Unit did. The Northeastern, Southeastern, and Western Units were 8.1, 8.9, and 2.0 percent forested, respectively.
- In 1974 forests covered only 4.3 percent (1.6 million acres) of Iowa. Although forest land increased in all Units, the largest increase was in the Southeastern Unit—41.7 percent from 1974 to 1990 (fig. 2).

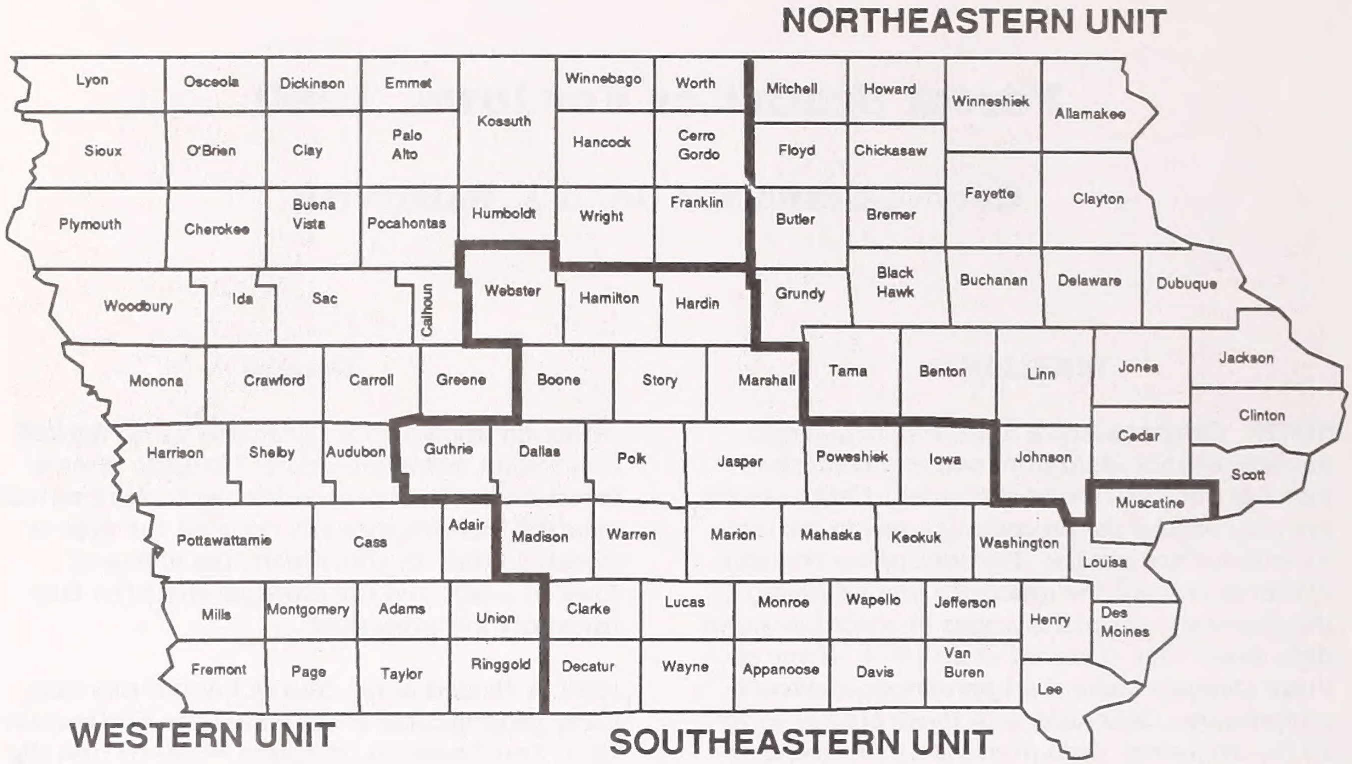

Figure 1.—*Forest Survey Units in Iowa.*

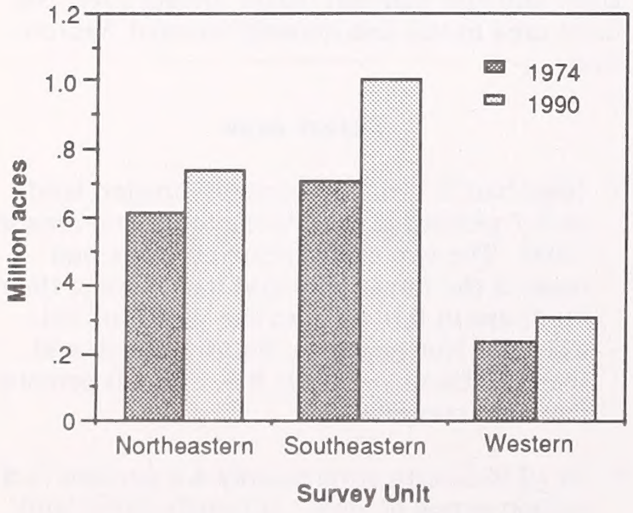

Figure 2.—*Area of forest land by Forest Survey Unit, Iowa, 1974 and 1990.*

- Timberland in Iowa was estimated at 1.9 million acres in 1990, up from 1.5 million acres in 1974. The 1974 to 1990 increase in timberland area reversed the sharp decline observed from 1954 to 1974. Most of the new timberland came from land formerly classified as pasture (improved pasture, wooded pasture, and improved pasture with trees), but now no longer grazed.

- Farmers owned 1.2 million acres (nearly 64 percent) of the timberland in Iowa in 1990 (fig. 3). Landowners classified as miscellaneous private owned an additional 546,000 acres (about 28 percent) of timberland. Public agencies administered only 8 percent of the timberland in Iowa.

- As in 1974, the white oak-red oak-hickory forest type in 1990 covered more area than any other forest type (37 percent). It

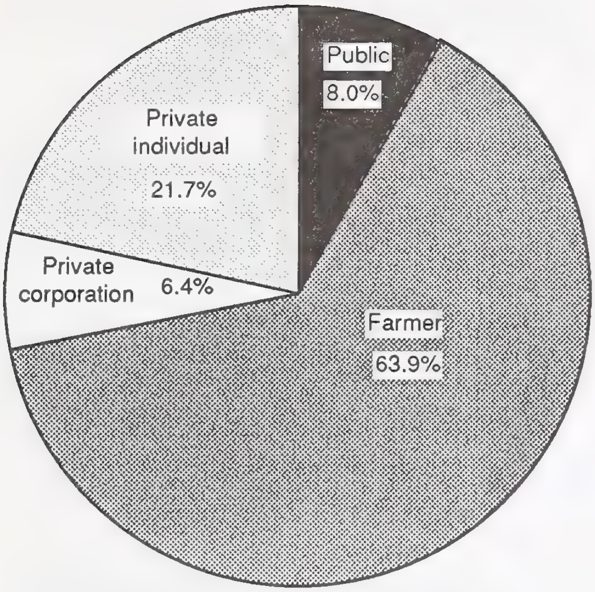

Figure 3.—*Ownership of timberland, Iowa, 1990.*

increased in area about 29 percent between inventories; slightly less than the increase in timberland (33 percent). Maple-basswood forests covered about 25 percent of Iowa's timberland in 1990—a 74-percent increase over 1974. The elm-ash-soft maple forest type, covered 24 percent of the timberland. No other forest type covered more than 5 percent of the timberland (fig. 4).

- Sawtimber-size stands covered 1.3 million acres in 1990, up 410,000 acres from 1974 and still the most common size class (fig. 5). The area of sapling-seedling-size stands remained about the same at 289,000 acres.

Number of Trees

- Timberland in 1990 averaged 10 percent more live trees and growing-stock trees per acre than in 1974.

- Trees of the elm, noncommercial, other hardwoods, select[1] hickory, and select white oak species groups occurred most frequently on timberland in 1990.

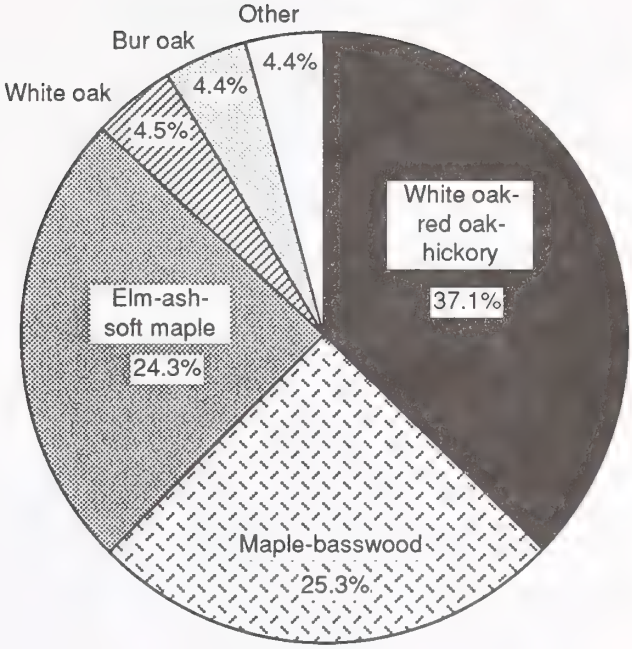

Figure 4.—*Distribution of forest types on timberland, Iowa, 1990.*

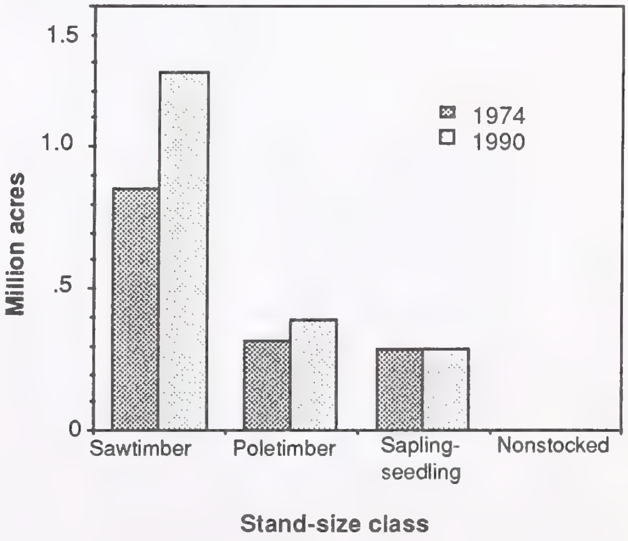

Figure 5.—*Area of timberland by stand-size class, Iowa, 1974 and 1990.*

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[1] *"Select" and "other" are used to separate the white oaks, red oaks, and hickories into two species groups. The "select" groups contain species that are generally capable of producing high quality products.*

Volume

- Growing-stock volume in 1990 was 1.7 billion cubic feet; up 46 percent from the 1974 growing-stock volume of 1.1 billion cubic feet. Volume per acre also increased from 780 to 860 cubic feet per acre.

- Select white oak (334 million cubic feet), select red oak (189 million), soft maple (163 million), and cottonwood (150 million) species groups continued to contain the most growing-stock volume on timberland in 1990 (fig. 6). As in 1974, 99 percent of the growing-stock volume was in hardwoods.

- Sawtimber volume increased from 3.8 billion board feet in 1974 to 5.8 billion board feet in 1990. There was an average of 2,968 board feet per acre in 1990 compared to 2,579 board feet per acre in 1974.

- The distribution of growing-stock volume among diameter classes remained about the same between inventories with the 14-inch class containing the most volume (fig. 7).

- The Southeastern Unit contained the most growing-stock volume (787 million cubic feet), but the Northeastern Unit had the greatest average volume per acre (933 cubic feet per acre).

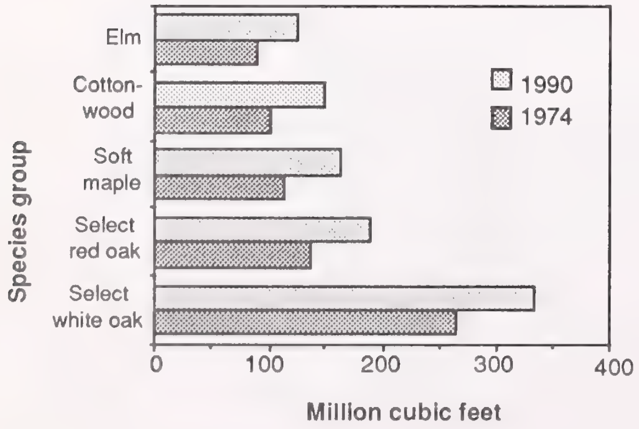

Figure 6.—*Species groups with the largest growing-stock volume on timberland, Iowa, 1974 and 1990.*

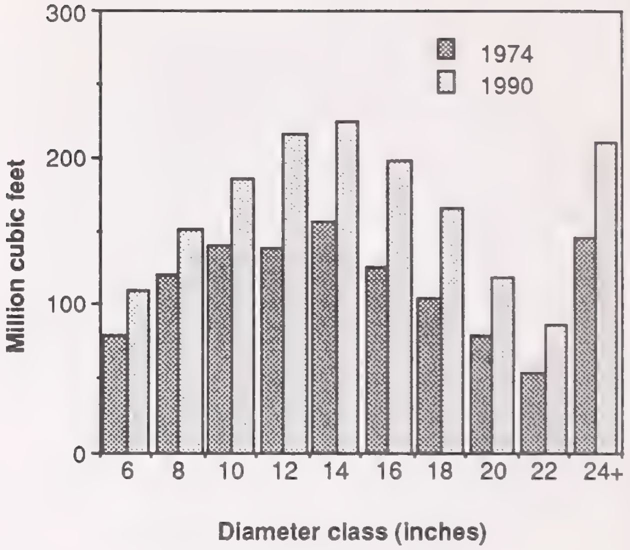

Figure 7.—*Growing-stock volume on timberland by diameter class, Iowa, 1974 and 1990.*

- Volume in rough and rotten trees and salvable dead trees increased the total amount of wood available in 1990 by 867 and 80 million cubic feet, respectively. The volume in growing-stock trees and rough trees showed the largest increases between inventories with an additional 522 million cubic feet and 355 million cubic feet, respectively (fig. 8).

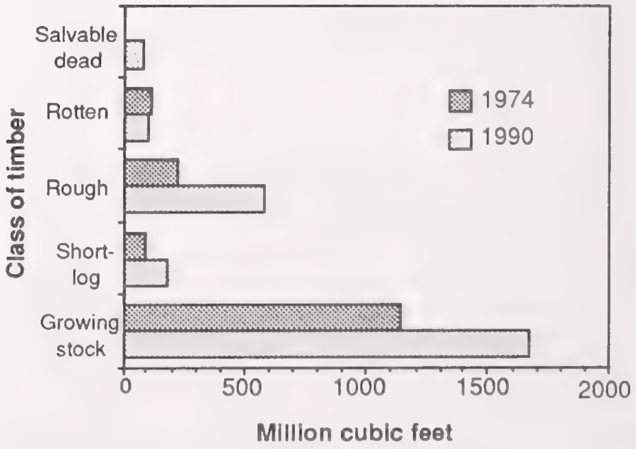

Figure 8.—*Net volume of timber on timberland by class of timber, Iowa, 1974 and 1990.*

- Farmers owned 989 million cubic feet (59 percent) of growing-stock volume in 1990.

Timber Growth, Mortality, and Removals

- Growing-stock volume increased at an average annual rate of 44 million cubic feet (3.1 percent of the average inventory) from 1974 to 1990. During the same period, sawtimber volume increased an average of 197 million board feet per year (4.1 percent of the average inventory).

- Growing-stock mortality averaged 8.3 cubic feet per acre per year between 1974 and 1990, and net growing-stock growth averaged 22.6 cubic feet per acre per year during the period.

- Between 1974 and 1990, the average net growth for sawtimber was 101 board feet per acre per year. Mortality reduced sawtimber volume by an average of 22 board feet per acre per year.

- Average net annual growth exceeded removals from 1974 to 1990 for both growing stock and sawtimber. Removals were 55 percent of growing-stock growth and 46 percent of sawtimber growth.

- Average annual removals of select white oak (5.3 million cubic feet) nearly equaled the average annual growth of select white oak (5.5 million cubic feet) growing stock (fig. 9). However, with a sampling error of ± 1.0 million cubic feet for removals and a sampling error of ± 0.8 million cubic feet for growth, select white oak growing-stock growth and removals were not statistically different.

- Sawtimber growth was almost twice removals for select white oak, select red oak, and soft maple (fig. 10).

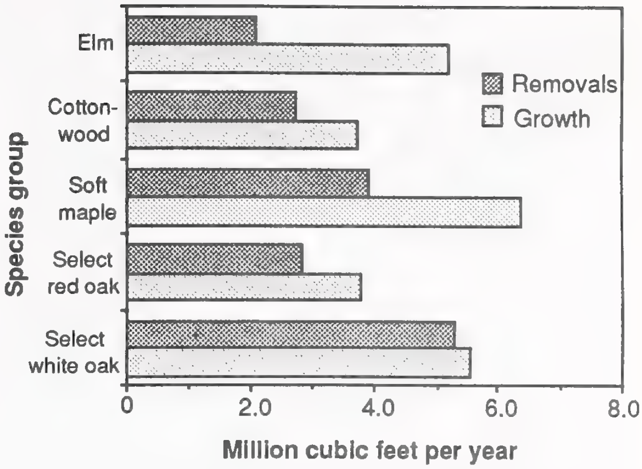

Figure 9.—*Average annual growth and removals of growing-stock volume for selected species groups on timberland, Iowa, 1974-1989.*

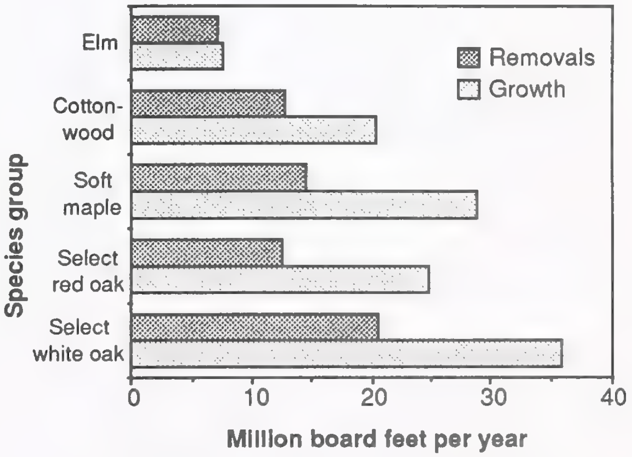

Figure 10.—*Average annual growth and removals of sawtimber volume for selected species groups on timberland, Iowa, 1974-1989.*

- The elm species group, because of continued incidence of Dutch elm disease, had the largest average annual mortality between 1974 and 1990. Elm accounted for 33 percent of the growing-stock mortality and 26 percent of the sawtimber mortality. Even with the large volume of mortality, average net growing-stock growth still exceeded average annual removals (fig. 9).

- Although publicly owned timberland contained only about 8 percent of the growing-stock volume, it produced almost 17 percent of the growing-stock removals between 1974 and 1990.

Biomass

- Growing-stock trees greater than 5 inches d.b.h. made up most (55 percent) of the biomass of live trees greater than 1 inch d.b.h. in 1990. Rough and rotten trees greater than 5 inches d.b.h. accounted for an additional 36 percent of the live tree biomass.

- Commercial tree species comprised nearly half (47 percent) of the biomass of woody vegetation less than 1 inch d.b.h. in 1990.

APPENDIX

ACCURACY OF THE SURVEY

The Forest Inventory and Analysis sampling procedure is designed to provide reliable statistics at the State and Survey Unit levels. Because the inventory is a sample of Iowa's forests, the reported figures are estimates. Sampling errors measure the reliability of these estimates. From sampling errors we can compute, for a specified probability, the range of values likely from a 100-percent inventory, provided the same methods were used in the 100-percent inventory.

For example, the estimated growing-stock volume in Iowa in 1990—1,663 million cubic feet—has a sampling error of ± 3.24 percent (± 53.9 million cubic feet). The growing-stock volume from a 100-percent inventory would be expected to fall between 1,609 and 1,717 million cubic feet (1,663 ± 53.9), there being a one in three chance that this is not so.

The following tabulation shows the sampling errors for the 1990 Iowa inventory:

Item	State totals	Sampling error
Growing stock	(Million cubic feet)	(Percent)
Volume (1990)	1,663.0	3.24
Average annual growth (1974-1989)	44.0	5.02
Average annual removals (1974-1989)	24.1	9.11
Sawtimber	(Million board feet)	
Volume (1990)	5,768.2	3.90
Average annual growth (1974-1989)	196.9	5.61
Average annual removals (1974-1989)	90.4	9.67
Timberland	(Thousand acres)	
Area (1990)	1,943.5	1.92

Breaking survey data down into sections smaller than State totals increases the sampling error (fig. 11). When the estimate of area, volume, or growth is half the State total, the sampling error is about 1.4 times as large as the sampling error listed in the previous tabulation. The multiplier increases rapidly for smaller fractions, however, so that estimates that are only one-tenth of the State total have sampling errors more than three times the statewide sampling error. To estimate sampling error for data smaller than State totals, use the formula on the next page:

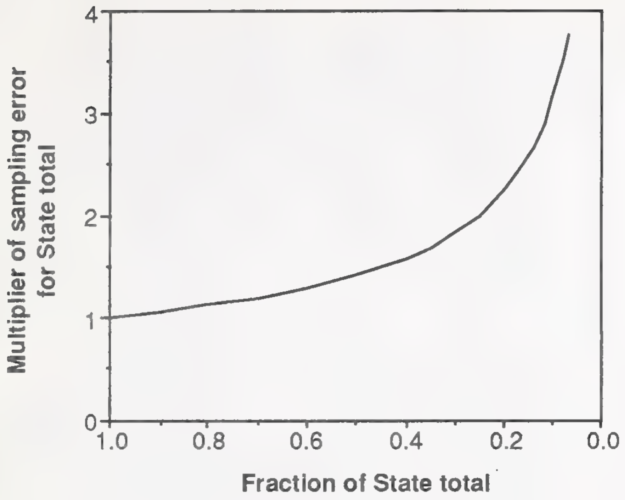

Figure 11.—*Relation between sampling error and estimates smaller than State totals.*

$$E = \frac{(SE)\sqrt{\text{State total area or volume}}}{\sqrt{\text{Volume or area smaller than State total}}}$$

where:

E = sampling error in percent
SE = State total error for area or volume

For example, to compute the error on the area of timberland in the elm-ash-soft maple type in the State, proceed as follows:

The total area of elm-ash-soft maple type in the State from table 3 = 472,900 acres.

The total area of timberland in the State from table 3 = 1,943,500 acres.

The State total error for timberland area from the above tabulation = 1.92 percent.

Using the above formula:

$$\text{Error} = \frac{(1.92)\sqrt{1{,}943{,}500}}{\sqrt{472{,}900}}$$

$$= \pm 3.89 \text{ percent}$$

SURVEY PROCEDURES

The 1990 Iowa survey used a growth model enhanced, two-phase remeasurement sample design. This sampling scheme and associated estimators are similar to the design used at the Pacific Northwest Forest and Range Experiment Station in the inventory of eastern Washington and Oregon[2]. With this design, field crews revisit every plot measured in the previous inventory. On some plots (remeasurement plots) they take all measurements. On other plots (status check plots) the field crew only records tree status (live, cut, or dead) and merchantability (growing stock, rough, or rotten). For both types of plots the field crew measures trees that have grown onto the plot since the last inventory. New plots were added to the sample to replace plots that were measured in 1974 but could not be relocated. New photo plots were also added to sample reserved forest lands.

The Iowa design differs from the eastern Washington and Oregon design because it uses a growth model to improve regression estimates made on status check plots. Figure 12 presents a graphical overview of the Iowa sample design. The growth model used in the Iowa survey design was the Central States Stand and Tree Evaluation and Modeling System (STEMS)[3].

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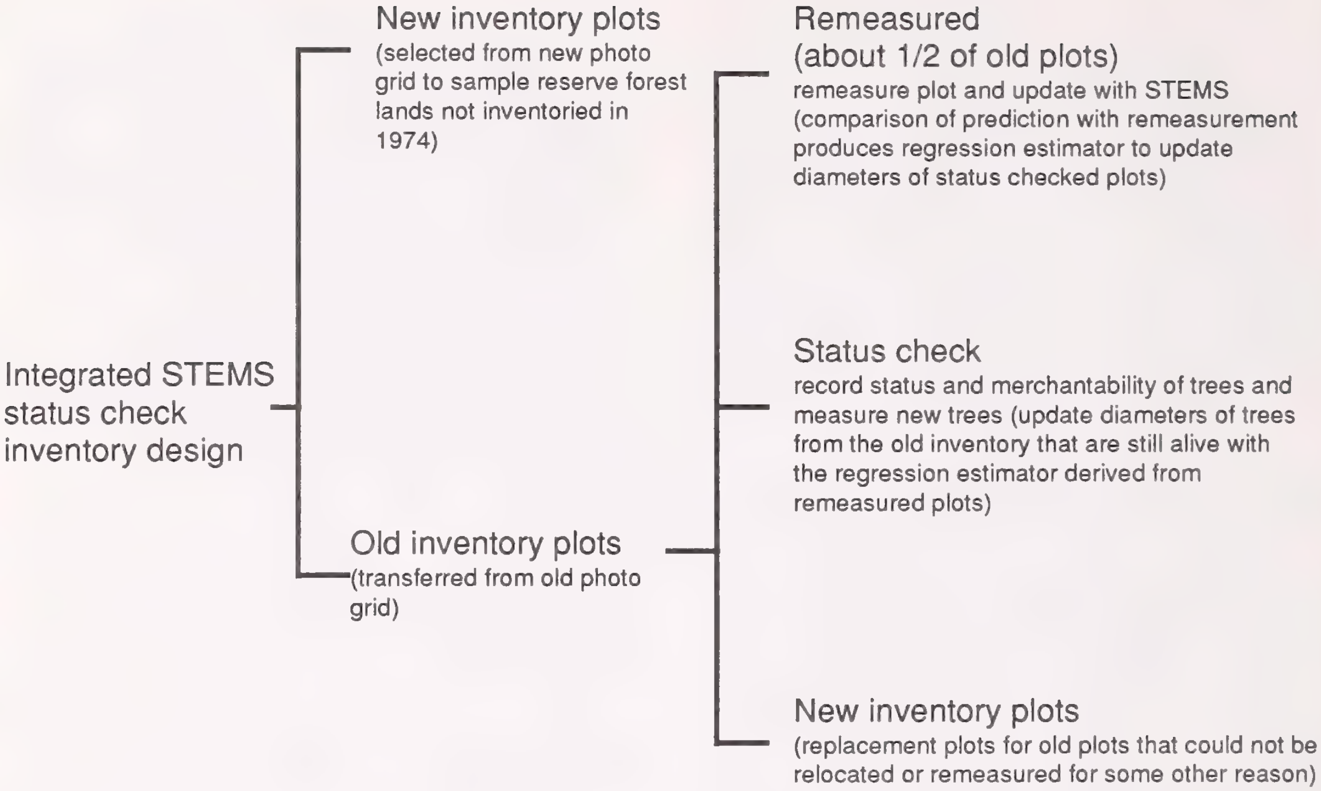
[2] *MacLean, C.D. 1981. Walk-through inventory: a shortcut substitute for remeasuring slow-growing inventory plots. Gen. Tech. Rep. WO-28. Washington, DC: U.S. Department of Agriculture, Forest Service: 389-393.*

[3] *Shifley, S.R. 1987. A generalized system of models forecasting Central States tree growth. Res. Pap. NC-279. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 10 p.*



Integrated STEMS status check inventory design

New inventory plots (selected from new photo grid to sample reserve forest lands not inventoried in 1974)

Old inventory plots (transferred from old photo grid)

Remeasured (about 1/2 of old plots) remeasure plot and update with STEMS (comparison of prediction with remeasurement produces regression estimator to update diameters of status checked plots)

Status check record status and merchantability of trees and measure new trees (update diameters of trees from the old inventory that are still alive with the regression estimator derived from remeasured plots)

New inventory plots (replacement plots for old plots that could not be relocated or remeasured for some other reason)

Figure 12.—*Overview of the Iowa sample design.*

These were the major steps in the 1990 Iowa survey design:

1. Aerial photography (Phase 1)

In this phase ground plot locations from the 1974 inventory were relocated on new photography. The USDA Agricultural Stabilization and Conservation Service provided 1:40,000 scale black and white prints. Photographs were taken in the following years (shown in the tabulation on the next page).

Aerial photogrammetrists assembled the photographs into township mosaics and overlaid a systematic grid of 121 one-acre photo plots (each plot representing approximately 190.4 acres) on each township mosaic. They then stereoscopically examined each photo plot and classified the plots based on land use. If trees were present, forest type and stand-size density class were recorded. All of the 1974 ground plot locations were sent to the field for verification of the photo classification and for further measurements. In addition, one-fifth of the new photo plots on reserved forest lands were selected as ground plots because these areas had been excluded from the 1974 inventory. The 201,969 photo plots were classified in the following way:

Photo land class	**Photo plots**
Timberland	11,529
Reserved forest land	373
Unproductive forest land	1
Other forest land	8
Questionable	195
Nonforest with trees	3,059
Nonforest without trees	185,020
Water	1,784
All classes	201,969

Unit & County	Year
Northeastern Unit	
Allamakee	1979
Benton	1978
Black Hawk	1979
Bremer	1979
Buchanan	1979
Butler	1980
Cedar	1979
Chickasaw	1979
Clayton	1979
Clinton	1979
Delaware	1979
Dubuque	1979
Fayette	1979
Floyd	1979
Grundy	1980
Howard	1979
Jackson	1979
Johnson	1979
Jones	1979
Linn	1979
Mitchell	1980
Scott	1978
Tama	1980
Winneshiek	1979
Southeastern Unit	
Appanoose	1977
Boone	1980
Clarke	1982
Dallas	1977
Davis	1978
Decatur	1977
Des Moines	1978
Guthrie	1982
Hamilton	1980
Hardin	1980
Henry	1978
Iowa	1979
Jasper	1982
Jefferson	1978
Keokuk	1978
Lee	1978
Louisa	1978
Lucas	1977
Madison	1982
Mahaska	1978
Marion	1982
Marshall	1980
Monroe	1977
Muscatine	1978
Polk	1982
Poweshiek	1979
Story	1980
Van Buren	1978
Wapello	1978
Warren	1982
Washington	1978
Wayne	1977
Webster	1981
Western Unit	
Adair	1982
Adams	1974
Audubon	1977
Buena Vista	1978
Calhoun	1981
Carroll	1978
Cass	1982
Cerro Gordo	1980
Cherokee	1977
Clay	1978
Crawford	1977
Dickinson	1978
Emmet	1981
Franklin	1978
Fremont	1981
Greene	1981
Hancock	1980
Harrison	1981
Humboldt	1980
Ida	1977
Kossuth	1980
Lyon	1978
Mills	1978
Monona	1981
Montgomery	1979
O'Brien	1978
Osceola	1978
Page	1981
Palo Alto	1981
Plymouth	1978
Pocahontas	1981
Pottawattamie	1981
Ringgold	1981
Sac	1977
Shelby	1977
Sioux	1979
Taylor	1980
Union	1982
Winnebago	1980
Woodbury	1981
Worth	1980
Wright	1980

2. Plot measurements (Phase 2)

Field crews revisited all old ground plots. Each old ground plot that could not be relocated was replaced with a new plot at the approximate location of the old one. Each plot is a cluster of 10 points covering approximately 1 acre. At each point, trees 5.0 inches or more in d.b.h. were sampled on a 37.5 Basal Area Factor (BAF) variable-radius plot, and trees less than 5.0 inches d.b.h. were sampled on a 1/300-acre fixed-radius plot.

On approximately one-half the plots (the status check plots), a partial set of items was tallied on trees measured at the 1974 inventory. For these trees, only tree history (status and merchantability) and cause of death (if the tree had died) were tallied. New trees on the status check plots and all trees on the remaining plots had the complete set of items tallied. Some plots originally selected as status check plots became full measurement plots to ensure that sufficient plots containing high-valued minor species such as black walnut and butternut were remeasured.

Plots with the complete set of items tallied were projected from the 1974 inventory to the current time using STEMS. The procedure provides a comparison between measured and projected tree diameters for about half the trees. Adjustment factors (a modification of the method described by Smith[4]), computed from the comparison of the observed and projected diameters, provide a local calibration of the STEMS model to conditions existing from 1974 to 1990. The adjusted model was used to project the 1974 diameters of trees on the status check plots. Projected diameters of trees on the status check plots were summarized as if they were measured in the field. Because all trees that had died or had been cut since 1974 were recorded, mortality and removals did not need to be projected for any plots. Ground plots were distributed as follows:

Ground land use class	Old plots remeasured	Old plots with status check	New plots	Total plots
Timberland	397	222	7	626
Reserved forest land	3	4	74	81
Other forest land	4	2	0	6
Nonforest with trees	153	11	1	165
Nonforest without trees	11,705	17	65	11,787
Water	86	1	17	104
Total	12,348	257	164	12,769

3. Area estimates

Area estimates were made using two-phase estimation methods. In this type of estimation, a preliminary estimate of area by land use is made from the aerial photographs (Phase 1) and corrected by the plot measurements (Phase 2). Loetsch and Haller[5] present a complete description of the method.

4. Volume estimates

Hahn and Hansen[6] developed the net cubic foot volume equations used to compute the volume of trees measured or modeled on the 10-point plots. The summed tree volumes provide estimates of volume per acre for each ground plot. Estimates of volume per acre were multiplied by the area estimates to obtain estimates of total volume.

The Forest Service reports all board foot volume in International 1/4-inch rule. In Iowa, both the Doyle and Scribner log rules are commonly used. Doyle log rule conversion factors were derived from full tree measurements taken throughout the Central States (Illinois, Indiana, Iowa, and Missouri) and Scribner log rule conversion factors were derived from full tree measurements taken throughout the Lake States (Michigan, Wisconsin, and Minnesota). The full tree measurements were used in an equation developed by Wiant and Castenaeda[7] to produce the following factors (multipliers) used to convert board foot International volumes to the Doyle or Scribner rule:

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[4] *Smith, W. Brad. 1983. Adjusting the STEMS regional growth models to improve local predictions. Res. Note NC-297. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 5 p.*

[5] *Loetsch, F.; Haller, K.E. 1964. Forest inventory, volume 1, statistics of forest inventory and information from aerial photographs. BLV Verlagsgesellschaft Munch Basle Vienna. 436 p.*

[6] *Hahn, Jerold T.; Hansen, Mark H. 1991. Cubic and board foot volume models for the Central States. Northern Journal of Applied Forestry. 8(2): 47-57.*

[7] *Wiant, Harry V., Jr.; Castenaeda, Froylan. 1974. Mesavage and Girard's volume tables formulated. BLM4. Denver, CO: U.S. Department of Interior, Bureau of Land Management, Denver Service Center: 1-4.*

D.B.H. (inches)	Doyle rule conversion factor		Scribner rule conversion factor	
	Softwoods	Hardwoods	Softwoods	Hardwoods
9.0-10.9	0.3455	—	0.7830	—
11.0-12.9	0.4780	0.4172	0.8287	0.8317
13.0-14.9	0.5992	0.5118	0.8577	0.8611
15.0-16.9	0.6908	0.5882	0.8784	0.8827
17.0-18.9	0.7685	0.6569	0.8945	0.8999
19.0-20.9	0.8573	0.7180	0.9079	0.9132
21.0-22.9	0.8645	0.7829	0.9168	0.9239
23.0-24.9	0.9276	0.8324	0.9240	0.9325
25.0-26.9	0.9493	0.8736	0.9299	0.9396
27.0-28.9	0.9710	0.9473	0.9321	0.9454
29.0+	1.1065	1.1349	0.9357	0.9544

5. Growth and mortality estimates

Estimates of growth and mortality per acre come from the remeasured and projected diameters of trees and from observation of trees that died between inventories. Growth is reported as the average net annual growth between the two inventories (1974 and 1990) and computed from data on remeasurement plots and modeled plots using methods presented by VanDeusen *et al.*[8]. Mortality is also average net annual for the remeasurement period. On new plots, where trees were not remeasured, estimates of growth and mortality were obtained by using STEMS to project the growth and mortality of trees for 1 year. Growth on status check plots was estimated using the projected tree diameters obtained from the STEMS growth model. The STEMS growth model was adjusted to Iowa conditions using data from the remeasurement plots. As with volume, total growth and mortality estimates were obtained by multiplying the per acre estimates by area estimates. Current annual growth for 1990 was computed by using the adjusted STEMS model to grow all current inventory plots for 1 year.

6. Average annual removals estimates

Average annual growing-stock and sawtimber removals (1974 to 1990) were estimated from the remeasured and status check plots. These estimates are obtained from trees measured in the last survey and cut or otherwise removed from the timberland base.

7. Timber removals, utilization, and timber product output estimates

Statistics on timber product output during 1988 came from a canvass of known primary wood-using mills that consume Iowa bolts and logs. Iowa Department of Natural Resources (DNR) foresters canvassed the mills in Iowa. The North Central Forest Experiment Station (NCFES) mailed a similar questionnaire to all out-of-State mills using Iowa roundwood.

Logging utilization factors were used to estimate the logging residue. These factors were determined from logging utilization studies conducted between 1984 and 1987 in the Central States by NCFES and deemed suitable for estimating timber removals in Iowa.

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[8] *VanDeusen, P.C.; Dell, T.R.; Thomas, C.E. 1986. Volume growth estimation from permanent horizontal points. Forest Science. 32: 415-422.*

Residential fuelwood and fence post statistics were developed for Iowa based on data from the Bureau of Census 1980 population figures, preliminary species volume distribution data from the 1990 Iowa survey, and harvesting patterns and species preference from recent fuelwood studies in Illinois (1983) and Missouri (1987). Harvest patterns and individual species preferences for areas of similar population density were mapped onto current inventory data to develop fuelwood harvest distributions by species preferences. A similar process was used to estimate post production. Detailed information about removals, utilization, and outputs can be found in Smith and Tibben[9].

Because all primary wood-using mills were canvassed, there is no sampling error associated with roundwood products or the wood and bark residue generated from these products. Fuelwood and post data are estimated to have an error of about ± 15 percent at the State level.

COMPARING IOWA'S THIRD INVENTORY WITH THE SECOND INVENTORY

The following paragraphs highlight some procedural changes since the last inventory to help the reader analyze data from this report:

New volume equations developed for the Central States (see Survey Procedures section) were used to compute the 1990 volumes and to recompute the 1974 volume. Although the adjustment will differ by Survey Unit and species, the recomputed 1974 growing-stock and board foot volumes are generally greater than those shown in the 1974 report.

Mortality figures published in the 1974 inventory report were based on field estimates of the number of trees that died in the 3 years before the inventory. Information gathered on remeasurement plots during the current inventory was used to adjust the 1974 mortality figures. This adjustment also will affect the estimate of net growth for the 1974 inventory.

The previous survey used only growing-stock trees to determine stand-size class. Current survey procedures require that stand-size class be determined by all live trees. Therefore, direct comparisons of current inventory data to the published 1974 data by stand-size class may be misleading.

Forest typing has changed since the 1974 survey. Current methods require that stands contain more bur oak, the white oaks, or cottonwood to be classed as bur oak, white oak, or cottonwood forest type, respectively. Therefore, 1974 forest types have been reclassified using the 1990 methods.

Potential productivity is generally greater when current methods are applied to the previous inventory than the methods used to compile the 1974 report. Therefore, comparisons of the potential productivity in 1974 and 1990 may be misleading.

TREE/LOG GRADE

In Iowa the butt section of every sawtimber sample tree was graded for quality on approximately one-half of the sample plots (remeasured and new plots). The volume yield by tree/log grade for species in this sample was used to distribute the volume of trees in the ungraded sample into tree/log-grade classes by species group.

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[9] *Smith, W. Brad; Tibben, John. 1990. The timber industry of Iowa: an assessment of timber product output and use, 1988. Resour. Bull. NC-126. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 26 p.*

Grading specifications used by the field crews are presented in the following tables. Hardwood sawtimber trees were graded according to "Hardwood tree grades for factory lumber"[10], unless minimum specifications for grade 3 were not met. In those cases a grade 4 was assigned according to "Forest Service standard specifications for hardwood construction logs"[11]. White pine sawtimber trees were graded according to the table "Log grades for eastern white pine"[12]. The table "Log grades for all other softwoods"[13] provides grading criteria for other softwood sawtimber trees. For all softwoods, the first 16-foot log, or shorter lengths down to 12 feet, were used for grading.

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[10] *Hanks, Leland F. 1976. Hardwood tree grades for factory lumber. Res. Pap. NE-333. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 81 p.*

[11] *Rast, Everette D.; Sonderman, David L.; Gammon, Glenn L. 1973. A guide to hardwood log grading. Gen. Tech. Rep. NE-1. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 31 p.*

[12] *Campbell, Robert A. 1964. Forest Service log grades for southern pine. Res. Pap. SE-11. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. 17 p.*

[13] *Peterson, Ted. 1965. Log grades. Spec. Circ. 60. Madison, WI: University of Wisconsin Extension Service, College of Agriculture. 4 p.*

HARDWOOD TREE GRADES FOR FACTORY LUMBER

Grade factor	Tree grade 1	Tree grade 2	Tree grade 3
Length of grading zone (feet)	Butt 16	Butt 16	Butt 16
Length of grading section [a] (feet)	Best 12	Best 12	Best 12
DBH, minimum (inches)	16[b]	13	11
Diameter, minimum inside bark at top of grading section (inches)	13[b] 16 20	11[c] 12	8
Clear cuttings (on the 3 best faces)[d]			
Length, minimum (feet)	7 5 3	3 3	2
Number on face (maximum)	2	2 3	[e]
Yield in face length (minimum)	5/6	4/6	3/6
Cull deduction (including crook and sweep, but excluding shake) maximum within grading section (percent)	9	9[f]	50

[a] Whenever a 14- or 16-foot section of the butt 16-foot log is better than the best 12-foot section, the grade of the longer section will become the grade of the tree. This longer section, when used, is the basis for determining the grading factors such as diameter and cull deduction.

[b] In basswood and ash, DIB at top of grading section must be 12 inches and DBH must be 15 inches.

[c] Grade 2 trees can be 10 inches DIB at top of grading section if otherwise meeting surface requirements for small grade 1's.

[d] A clear cutting is a portion of a face free of defects, extending the width of the face. A face is one-fourth of the surface of the grading section as divided lengthwise.

[e] Unlimited.

[f] Fifteen percent crook and sweep or 40 percent total cull deduction are permitted in grade 2, if size and surface of grading section qualify as grade 1. If rot shortens the required clear cuttings to the extent of dropping the butt log to grade 2, do not drop the tree's grade to 3 unless the cull deduction for rot is greater than 40 percent.

Forest Service standard specifications for hardwood construction logs (tie and timber logs)[1]

Position in tree	Butts and uppers
Min. diameter, small end	8 inches +
Min. length without trim	8 feet
Clear cuttings	No requirements
Sweep allowance	One-fourth of the diameter at the small end for each 8 feet of length.
Sound surface defects:	
Single knots	Any number, if no one knot has an average diameter above the callus in excess of one-third of the log diameter at point of occurrence.
Whorled knots	Any number, if the sum of knot diameters above the callus does not exceed one-third of the log diameter at point of occurrence.
Holes	Any number, provided none has a diameter over one-third of the log diameter at point of occurrence and none extends more than 3 inches into included timber[2].
Unsound surface defects :	Same requirements as for sound defects if they extend into included timber. No limit if they do not.

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[1] *These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, it may be necessary to subdivide the class into grades.*

[2] *Included timber is always square, and dimension is judged from small end.*

LOG GRADES FOR EASTERN WHITE PINE

Log grade	Minimum size[1]		Sweep or crook allowance	Total cull allowance including sweep	Maximum weevil injury	Allowable knot size(inches)[2] on three best faces or minimum clearness on four faces
	Diameter	Length				
	(Inches)	*(Feet)*	*(Percent)*	*(Percent)*	*(Number)*	*(Inches)*
1	12 & 13	8-16	20	50	0	Four faces clear full length
	14+	10-16	20	50	0	Two faces clear full length, or four faces clear 50 percent length (6 feet min. length)[3]
2	6+	8-16	30	50	0	Sound knots ≤[4] D/6 and less than 3 inches[5] Unsound knots: ≤1-1/2 inches and for: butt, logs ≤ D/12 upper logs ≤ D/10, or four faces clear 50 percent of length
3	6+	8-16	40	50	8-foot logs: 1 weevil	Sound knots ≤ D/3 and less than 5 inches
					10-foot+ logs: 2 weevils	Unsound knots ≤ D/6 and less than 2-1/2 inches
4	6+	8-16	50	50	No limit	No limit

[1] *Plus trim.*

[2] *Disregard all knots less than 1/2-inch diameter in all grades.*

[3] *The sum of the diameter of sound knots plus twice the sum of the diameter of unsound knots (in inches) is less than or equal to half of the diameter of the log (inches).*

[4] *≤ means less than or equal to.*

[5] *D means d.i.b. of log at location of knot.*

LOG GRADES FOR ALL OTHER SOFTWOOD LOGS

Grade 1

1. Logs must be 16 inches in diameter or larger, 10 feet in length or longer, and with deduction for defect not over 30 percent of gross scale.
2. Logs must be at least 75 percent clear on each of three faces.
3. All knots outside clear cutting must be sound and not more than 2-1/2 inches in size.

Grade 2

1. Logs must be 12 inches in diameter or larger, 10 feet in length or longer, and with a net scale after deduction for defect of at least 50 percent of the gross scale deducted for defect.
2. Logs must be at least 50 percent clear on each of three faces or 75 percent clear on two faces.

Grade 3

1. Logs must be 6 inches in diameter or larger, 8 feet in length or longer, and with a net scale after deduction for defect of at least 50 percent of the gross contents of the log.

Note: A) Diameters are diameter inside bark (d.i.b.) at small end of log.
B) Percent clear refers to percent clear in one continuous section.

METRIC EQUIVALENTS OF UNITS USED IN THIS REPORT

1 acre = 4,046.86 square meters or 0.405 hectare
1,000 acres = 405 hectares
1 cubic foot = 0.0283 cubic meter
1 foot = 30.48 centimeters or 0.3048 meter
1 inch = 25.4 millimeters, 2.54 centimeters, or 0.0254 meter
1 pound = 0.454 kilograms
1 ton = 0.907 metric tons

TREE SPECIES GROUPS IN IOWA[14]

SOFTWOODS		**Abundance[15]**
Eastern redcedar	*Juniperus virginiana*	c
Other softwoods		
Red pine	*Pinus resinosa*	vr
Eastern white pine	*Pinus strobus*	vr
White spruce	*Picea glauca*	vr
Balsam fir	*Abies balsamea*	vr
HARDWOODS		
Select white oak[HH]		
White oak	*Quercus alba*	vc
Swamp white oak	*Quercus bicolor*	r
Bur oak	*Quercus macrocarpa*	vc
Chinkapin oak	*Quercus muehlenbergii*	r
Other white oak[HH]		
Overcup oak	*Quercus lyrata*	vr
Post oak	*Quercus stellata*	r
Select red oak[HH]		
Northern red oak	*Quercus rubra*	vc
Other red oak[HH]		
Northern pin oak	*Quercus ellipsoidalis*	r
Shingle oak	*Quercus imbricaria*	c
Pin oak	*Quercus palustris*	r
Black oak	*Quercus velutina*	c
Select hickory[HH]		
Shellbark hickory	*Carya laciniosa*	vr
Shagbark hickory	*Carya ovata*	vc
Mockernut hickory	*Carya tomentosa*	r
Other hickory[HH]		
Bitternut hickory	*Carya cordiformis*	c
Basswood[SH]	*Tilia americana*	vc
Hard maple[HH]		
Black maple	*Acer nigrum*	c
Sugar maple	*Acer saccharum*	c
Soft maple[SH]		
Red maple	*Acer rubrum*	vr
Silver maple	*Acer saccharinum*	vc
Elm[SH]		
American elm	*Ulmus americana*	vc
Siberian elm	*Ulmus pumila*	r
Slippery elm	*Ulmus rubra*	c
Ash		
White ash[HH]	*Fraxinus americana*	c
Black ash[SH]	*Fraxinus nigra*	r
Green ash[HH]	*Fraxinus pennsylvanica*	c
Cottonwood[SH]	*Populus deltoides*	c
Willow[SH]	*Salix nigra*	c
Hackberry[SH]	*Celtis occidentalis*	c
Aspen [SH]		
Balsam poplar	*Populus balsamifera*	vr
Bigtooth aspen	*Populus grandidentata*	r
Quaking aspen	*Populus tremuloides*	r
Birch [SH]		
Paper birch	*Betula papyrifera*	r
River birch	*Betula nigra*	c
Black cherry[SH]	*Prunus serotina*	c
Black walnut[HH]	*Juglans nigra*	c
Other hardwoods		
Boxelder[SH]	*Acer negundo*	c
Ohio buckeye[SH]	*Aesculus glabra*	r
Northern catalpa[SH]	*Catalpa speciosa*	vr
Kentucky coffeetree[HH]	*Gymnocladus dioicus*	r
Flowering dogwood[HH]	*Cornus florida*	vr
Honeylocust[HH]	*Gleditsia triacanthos*	c
Butternut[SH]	*Juglans cinerea*	r
Red mulberry[SH]	*Morus rubra*	c
Sycamore [SH]	*Platanus occidentalis*	vr
Black locust[HH]	*Robinia pseudoacacia*	r
Sassafras[SH]	*Sassafras albidum*	vr

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[14] *The common and scientific names are based on: Little, Elbert L. 1981. Checklist of native and naturalized trees of the United States. Agric. Handb. 541. Washington, DC: U.S. Department of Agriculture, Forest Service. 385 p.*

[15] *Abundance is based on the number of trees ≥ 1 inch d.b.h. that were encountered on field plots (expressed as a proportion of the total number of trees): vr = very rare (< 0.0005), r = rare (0.0005 to < 0.005), c = common (0.005 to < 0.05), and vc = very common (≥ 0.05).*

[HH] *This species or species group is considered a hard hardwood, with an average specific gravity greater than or equal to 0.50.*

[SH] *This species or species group is considered a soft hardwood, with an average specific gravity of less than 0.50.*

HARDWOODS		**Abundance**[15]
Noncommercial species		
American hornbeam	*Carpinus caroliniana*	r
Eastern redbud	*Cercis canadensis*	vr
Hawthorn	*Crataegus* spp.	c
Osage orange	*Maclura pomifera*	c
Apple	*Malus* spp.	r
Eastern hophornbeam	*Ostrya virginiana*	vc
Wild plum	*Prunus* spp.	r
Pin cherry	*Prunus pensylvanica*	vr
Chokecherry	*Prunus virginiana*	r

SHRUB SPECIES IN IOWA

TALL SHRUBS [14]	
Juneberry	*Amelanchier* spp.
Dogwood	*Cornus* spp.
Hazel	*Corylus* spp.
Alder buckthorn	*Rhamnus* spp.
Sumac	*Rhus* spp.
Elder	*Sambucus* spp.
Viburnum	*Viburnum* spp.
Prickly ash	*Zanthoxylum americanum*
LOW SHRUBS [16]	
Honeysuckle	*Lonicera* spp.
Virginia creeper	*Parthenocissus* spp.
Poison ivy	*Rhus radicans*
Gooseberry-current	*Ribes* spp.
Rose	*Rosa* spp.
Raspberry-blackberry	*Rubus* spp.
Greenbrier	*Smilax* spp.
Snowberry	*Symphoricarpos* spp.
Yew	*Taxus canadensis*
Grape	*Vitis* spp.

DEFINITION OF TERMS

Average annual removals from growing stock.—The average net growing-stock volume in growing-stock trees removed annually for forest products (including roundwood products and logging residues) and for other uses (see Other removals). Average annual removals of growing stock are reported for a period of several years (1974 to 1990 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures).

Average annual removals from sawtimber.—The average net board foot sawtimber volume of live sawtimber trees removed annually for forest products (including roundwood products and other uses [see Other removals]). Average annual removals of sawtimber are reported for a period of several years (1974 to 1990 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures).

Basal area.—The area in square feet of the cross section at breast height of a single tree. When the basal area of all trees in a stand is summed, the result is usually expressed as square feet of basal area per acre.

Biomass.—The above-ground volume of all live trees (including bark and foliage) reported in green tons. Biomass is made up of 4 components:

Bole.—Biomass of a tree from one foot above the ground to a 4-inch top outside bark.

Tops and limbs.—Total biomass of a tree from a 1-foot stump minus the bole.

1- to 5-inch trees.—Total above-ground biomass of a tree from 1- to 5-inches in diameter at breast height.

Stump.—Biomass of a tree 5-inches d.b.h. and larger from the ground to a height of one foot.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam and hawthorn.)

Commercial forest land.—(See Timberland).

County and municipal land.—Land owned by counties and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

Cropland.—Land under cultivation within the past 24 months; including cropland harvested, crop failures, cultivated summer fallow, idle cropland used only for pasture, orchards, and land in soil improvement crops, but excluding land cultivated in developing improved pasture.

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[16] *The common and scientific names are based on: Fernald, M.L. 1987. Gray's manual of botany. Portland, OR: Dioscorides Press. 1,632 p. 1950 ed. reprinted.*

Cull.—Portions of a tree that are unusable for industrial wood products because of rot, form, or other defect.

Current annual removals from growing stock.—The current net growing-stock volume in growing-stock trees removed annually for forest products (including roundwood products and logging residues) and for other uses (see Other removals). Current annual removals of growing stock are reported for a single year (1988 in this report) and are based on a survey of primary wood processing mills to determine removals for products and information from remeasurement plots (see Survey Procedures in Appendix) to determine removals due to land use change.

Current annual removals from sawtimber.—The current net board foot sawtimber volume of live sawtimber trees removed annually for forest products (including roundwood products and other uses [see Other removals]). Current annual removals of sawtimber are reported for a single year (1988 in this report) and are based on a survey of primary wood processing mills to determine removals for products and information from remeasurement plots (see Survey Procedures in Appendix) to determine removals due to land use change.

Diameter classes.—A classification of trees based on diameter outside bark, measured at breast height (4.5 feet above the ground). (Note: d.b.h. is the common abbreviation for diameter at breast height. Two-inch diameter classes are commonly used in Forest Inventory and Analysis, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.)

Diameter at breast height (d.b.h.).—The outside bark diameter at 4.5 feet (1.37 m) above the forest floor on the uphill side of the tree. For the purposes of determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

Farm.—Any place from which $1,000 or more of agricultural products were produced and sold during the year.

Farmer-owned land.—Land owned by farm operators. (Note: Excludes land leased by farm operators from nonfarm owners, such as railroad companies and States.)

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide. Also see definitions for tree, land, timberland, reserved forest land, stocking, and water.

Forest type.—A classification of forest land based on the species forming a plurality of live tree stocking. Major forest types in the State are:

Other softwoods.—Forests in which species in the other softwoods group, singly or in combination comprise a plurality of the stocking.

Eastern redcedar.—Forests in which eastern redcedar comprises at least 50 percent of the stocking. (Common associates include the oaks and hickories.)

Eastern redcedar-hardwood.—Forests in which eastern redcedar comprises 25 to 50 percent of the stocking and eastern redcedar, oaks, and hickories in combination comprise a plurality of the stocking.

White oak-red oak-hickory.—Forests in which northern red oak, northern pin oak, black oak, white oak, bur oak, or hickories, singly or in combination, comprise a plurality of the stocking. (Common associates include American and slippery elm, hophornbeam, basswood, hackberry, and occasionally black cherry, white ash, and black walnut.)

White oak.—Forests in which the white oaks comprise at least 50 percent of the stocking. (Common associates include shagbark hickory, American elm, hophornbeam, northern red oak, slippery elm, and black oak.)

Bur oak.—Forests in which bur oak comprises at least 50 percent of the stocking. (Common associates include American elm, slippery elm, and shagbark hickory.)

Elm-ash-soft maple.—Forests in which lowland elm, ash, and red maple, silver maple, and cottonwood, singly or in combination, comprise a plurality of the stocking. (Common associates include boxelder, hackberry, black willow, and occasionally honey locust, black walnut, and hawthorn.)

Cottonwood-aspen.—Forests in which cottonwood or aspen comprises at least 50 percent of the stocking. (Common associates include silver maple and black willow or in which quaking aspen, bigtooth aspen, or paper birch, singly or in combination, comprise a plurality of the stocking.)

Maple-basswood.—Forests in which sugar maple, black maple, basswood, and upland elm, ash, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include hophornbeam, black walnut, northern red oak, hackberry, and occasionally bur oak, black cherry, and bitternut hickory.)

Growing-stock trees.—Live trees of commercial species that meet specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over, from one foot above the ground to a minimum 4.0 inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs. Cubic feet can be converted to standard cords by dividing by 79. One standard cord is 128 cubic feet of stacked wood, including bark and air.

Hard hardwoods.—Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, and hickories.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous. (See Soft hardwoods and Hard hardwoods.)

Improved pasture.—Land currently improved for grazing by cultivating, seeding, irrigating, or clearing of trees or brush and less than 16.7 percent stocked with live trees.

Indian land.—All lands held in trust by the United States for individual Indians or tribes, or all lands, titles to which are held by individual Indians or tribes, subject to Federal restrictions against alienation.

Industrial wood.—All roundwood products, except fuelwood.

Land.—A. *Bureau of the Census.* Dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

B. *Forest Inventory and Analysis.* The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

Log grades.—A classification of logs based on external characteristics as indicators of quality or value. (See Appendix for specific grading factors used.)

Logging residues.—The unused growing stock portions of trees cut or killed by logging.

Maintained road.—Any road, hard-topped or other surfaces, that is plowed or graded at least once a year. Includes rights-of-way that are cut or treated to limit herbaceous growth.

Marsh.—Nonforest land that characteristically supports low, generally herbaceous or shrubby vegetation and that is intermittently covered with water.

Merchantable.—Refers to a pulpwood or saw log section that meets pulpwood or saw log specifications, respectively.

Miscellaneous Federal land.—Federal land other than National Forest and land administered by the Bureau of Land Management.

Miscellaneous private land.—Privately owned land other than forest-industry and farmer-owned land. Also includes Indian land in the Iowa report.

Mortality.—The volume of sound wood in growing-stock and sawtimber trees that die annually.

Net annual growth of growing stock.—The annual change in volume of sound wood in live sawtimber and poletimber trees and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

Net annual growth of sawtimber.—The annual change in the volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

Net volume.—Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area to qualify as nonforest land.)

a. *Nonforest land without trees*.—Nonforest land with no live trees present.

b. *Nonforest land with trees*.—Nonforest land with one or more trees per acre at least 5 inches d.b.h.

Nonstocked land.—Timberland less than 16.7 percent stocked with growing-stock trees.

Other forest land.—Forest land not capable of producing 20 cubic feet per acre per year of industrial wood crops under natural conditions and not associated with urban or rural development. These sites often contain tree species that are not currently utilized for industrial wood production or trees of poor form, small size, or inferior quality that are unfit for industrial products. Unproductivity may be the result of adverse site conditions such as sterile soil, dry climate, poor drainage, high elevation, and rockiness. This land is not withdrawn from timber utilization.

Other removals.—Growing-stock trees removed but not utilized for products, or trees left standing but "removed" from the timberland classification by land use change. Examples are removals from cultural operations such as timber stand improvement work, land clearing, and changes in land use.

Ownership.—Property owned by one owner, despite the number of parcels in a specified area.

Ownership size class.—The amount of timberland owned by one owner, despite the number of parcels.

Owner tenure.—The length of time a property has been held by the owner.

Pasture.—Land presently used for grazing or under cultivation to develop grazing.

Pastured timberland.—Timberland for which the primary use is wood production, but is presently used for grazing.

Pant byproducts.—Plant residues used for products such as mulch, pulp chips, and fuelwood.

Plant residues.—Wood and bark materials generated at manufacturing plants during production of other products.

Poletimber stand.—(See Stand-size class.)

Poletimber tree.—A live tree of commercial species at least 5.0 inches d.b.h. but smaller than sawtimber size.

Potential productivity class.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Public land.—A class of land that includes county and municipal land, miscellaneous Federal land, and State land.

Reserved forest land.—Forest land withdrawn from timber utilization through statute, administrative regulation, designation, or exclusive use for Christmas tree production, as indicated by annual shearing.

Rotten trees.—Live trees of commercial species that do not contain at least one 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough trees.—(a) Live trees of commercial species that do not contain at least one merchantable 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Roundwood products.—Logs, bolts, or other round sections (including chips from roundwood) cut from trees for industrial or consumer uses. (Note: Includes saw logs, veneer logs and bolts; cooperage logs and bolts; pulpwood; fuelwood; piling; poles; posts; hewn ties; mine timbers; and various other round, split, or hewn products.)

Salvable dead trees.—Standing or down dead trees considered merchantable by regional standards.

Saplings.—Live trees 1.0 to 5.0 inches d.b.h.

Sapling-seedling stands.—(See Stand-size class.)

Saw log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter outside bark (d.o.b.) for softwoods of 7 inches (9 inches for hardwoods) or other combinations of size and defect specified by regional standards.

Saw log portion.—That part of the bole of sawtimber trees between the stump and the saw log top.

Saw log top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber stands.—(See Stand-size class.)

Sawtimber tree.—A live tree of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. Hardwoods must be at least 11.0 inches d.b.h.

Sawtimber volume.—Net volume of the saw log portion of live sawtimber in board feet, International 1/4-inch rule (unless specified otherwise) from stump to a minimum 7 inches top diameter outside bark (d.o.b.) for softwoods and a minimum 9 inches top d.o.b. for hardwoods.

Seedlings.—Live trees less than 1.0 inch d.b.h. that are expected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

Short-log (rough tree).—Sawtimber-size trees of commercial species that contain at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Soft hardwoods.—Hardwood species with an average specific gravity less than 0.50 such as cottonwood, basswood, and willow.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Stand.—A group of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Stand-age class.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Stand-size class.—A classification of stocked (see Stocking) forest land based on the size class of live trees on the area; that is, sawtimber, poletimber, or seedlings and saplings.

a. *Sawtimber stands*.—Stands with half or more of live stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

b. *Poletimber stands*.—Stands with half or more live stocking in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

c. *Sapling-seedling stands*.—Stands with more than half the live stocking in saplings and/or seedlings.

State land.—Land owned by States or leased to them for 50 years or more.

Stocking.—The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5 inches d.b.h.

Stands are grouped into the following stocking classes:

Overstocked stands.—Stands in which stocking of trees is 133.0 percent or more.

Fully stocked stands.—Stands in which stocking of trees is from 100.0 to 132.9 percent.

Medium stocked stands.—Stands in which stocking of trees is from 60.0 to 99.9 percent.

Poorly stocked stands.—Stands in which stocking of trees is from 16.7 to 59.9 percent.

Nonstocked areas.—Timberland on which stocking of trees is less than 16.7 percent.

Timberland.—Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization. (Note: Areas qualifying as timberland are capable of producing more than 20 cubic feet per acre per year of annual growth when managed. Currently inaccessible and inoperable areas are included unless the areas involved are small and unlikely to become suitable for producing industrial wood in the future.) Formerly called commercial forest land. (Also see definition of Pastured timberland.)

Timber removals from growing stock.—The net volume of growing stock in growing-stock trees removed for forest products (including roundwood products and logging residues) and for other uses (see Other removals). Timber removals from growing stock are reported for a single year (1988 in this report) and are based on information obtained from a survey of primary wood-using mills (see Survey Procedures in Appendix).

Timber removals from sawtimber.—The net board-foot volume of live sawtimber trees removed for forest products (including roundwood products and logging residues) and for other uses (see Other removals). Timber removals from sawtimber are reported for a single year (1988 in this report) and are based on information obtained from a survey of primary wood-using mills (see Survey Procedures in Appendix).

Timber products output.—All timber products cut from roundwood and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edging, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulpwood chips or other products.

Tree.—Woody plant having a well-developed stem and usually more than 12 feet tall at maturity.

Tree biomass.—The total aboveground weight (including the bark) of all trees from 1 to 5 inches in d.b.h., and the total aboveground weight (including the bark) from a 1-foot stump for trees more than 5 inches in diameter.

Tree grade.—A classification of the lower 16 feet of the bole of standing trees based on external characteristics as indicators of the quality and quantity of lumber produced from the tree (see the Appendix for details).

Tree size class.—A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings, and seedlings.

Urban and other areas.—Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; schoolyards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

Urban forest land.—Land that would otherwise meet the criteria for timberland, but is in an urban-suburban area surrounded by commercial, industrial, or residential development.

Water.—(a) *Bureau of the Census*.—Permanent inland water surfaces, such as lakes, reservoirs, and ponds at least 40 acres in area; and streams, sloughs, estuaries, and canals at least one-eighth of a statute mile wide.

(b) *Noncensus*.—Permanent inland water surfaces, such as lakes, reservoirs, and ponds from 1 to 39.9 acres in area; and streams, sloughs, estuaries, and canals from 120 feet to one-eighth of a statute mile wide.

Windbreaks.—A group of trees whose primary use is to protect buildings currently in use.

Wooded pasture.—Improved pasture with more than 16.7 percent stocking in live trees but less than 25 percent stocking in growing-stock trees. Area is currently improved for grazing or there is other evidence of grazing.

Wooded strip.—An acre or more of natural continuous forest land that would otherwise meet survey standards for timberland except that it is less than 120 feet wide.

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	Thousand acres	*Thousand acres*	*Thousand acres*	*Percent*	*Percent*	*Thousand acres*	*Thousand acres*	*Thousand acres*
Northeastern Unit								
Alamakee	405.4	104.1	100.7	8.4	24.8	2.8	0.6	21.0
Benton	459.7	14.2	13.8	22.8	3.0	0.4	--	5.7
Black Hawk	366.6	13.0	11.3	25.2	3.1	0.4	1.3	4.6
Bremer	281.1	14.5	13.9	22.7	4.9	0.1	0.5	2.9
Buchanan	366.2	13.5	13.2	23.3	3.6	0.2	0.1	3.7
Butler	372.4	11.2	10.4	26.2	2.8	0.2	0.6	4.7
Cedar	372.7	20.4	20.1	18.9	5.4	0.2	0.1	4.5
Chickasaw	322.9	8.5	8.2	29.6	2.5	0.3	--	3.3
Clayton	498.2	106.1	103.5	8.3	20.8	0.8	1.8	17.1
Clinton	444.7	27.9	27.2	16.2	6.1	0.1	0.6	4.4
Delaware	369.9	24.5	22.3	17.9	6.0	0.3	1.9	4.9
Dubuque	388.3	51.2	48.5	12.2	12.5	0.7	2.0	10.1
Fayette	468.0	38.9	38.2	13.7	8.2	0.4	0.3	9.5
Floyd	320.9	6.6	6.0	34.6	1.9	0.2	0.4	2.5
Grundy	320.8	0.4	0.4	*	0.1	--	--	0.8
Howard	302.6	8.4	7.9	30.1	2.6	0.1	0.4	3.6
Jackson	408.3	73.8	71.9	10.0	17.6	1.3	0.6	15.5
Johnson	393.0	38.2	28.8	15.8	7.3	0.3	9.1	5.8
Jones	368.8	28.7	28.0	16.0	7.6	0.4	0.3	3.7
Linn	463.4	46.2	44.4	12.7	9.6	0.5	1.3	7.6
Mitchell	300.5	9.0	8.9	28.4	3.0	0.1	--	3.5
Scott	293.8	11.3	9.7	27.2	3.3	0.7	0.9	2.6
Tama	461.7	22.6	21.3	18.3	4.6	0.4	0.9	7.2
Winneshiek	441.5	48.4	47.8	12.2	10.8	0.4	0.2	10.7
Total	9,191.4	741.6	706.4	3.2	7.7	11.3	23.9	159.9
Southeastern Unit								
Appanoose	318.5	40.4	34.5	14.4	10.8	0.2	5.7	10.9
Boone	367.0	30.3	24.3	17.2	6.6	0.1	5.9	4.4
Clarke	275.8	29.8	29.1	15.7	10.6	0.1	0.6	11.7
Dallas	378.1	22.4	20.3	18.8	5.4	0.1	2.0	6.5
Davis	322.6	42.5	40.5	13.3	12.6	0.1	1.9	10.7
Decatur	342.5	46.1	44.3	12.7	12.9	0.1	1.7	15.3
Des Moines	265.0	42.0	41.3	13.2	15.6	0.1	0.6	5.4
Guthrie	377.7	30.8	30.0	15.5	7.9	0.1	0.7	8.0
Hamilton	368.8	8.1	7.6	30.7	2.1	--	0.5	2.0
Hardin	364.2	13.6	12.8	23.7	3.5	--	0.8	3.7
Henry	279.0	34.9	33.0	14.7	11.8	0.1	1.8	8.0
Iowa	375.8	23.3	22.7	17.8	6.0	--	0.6	5.7
Jasper	468.0	17.2	16.4	20.9	3.5	0.1	0.7	8.9
Jefferson	281.4	23.4	22.6	17.8	8.0	--	0.8	8.3
Keokuk	371.3	31.2	30.8	15.3	8.3	0.2	0.2	9.9
Lee	334.0	60.7	59.0	11.0	17.7	0.1	1.6	14.8
Louisa	257.3	30.3	28.5	15.9	11.1	--	1.8	5.7
Lucas	276.8	32.6	29.3	15.6	10.6	0.1	3.2	10.7
Madison	360.1	45.6	45.0	12.6	12.5	0.1	0.5	11.9
Mahaska	365.7	23.5	22.7	17.8	6.2	0.1	0.7	7.6
Marion	358.5	42.7	38.4	13.7	10.7	0.1	4.2	12.6
Marshall	366.7	13.5	13.3	23.2	3.6	0.1	0.1	4.2
Monroe	277.7	46.4	45.2	12.6	16.3	0.1	1.1	13.5
Muscatine	282.6	25.2	24.0	17.3	8.5	0.1	1.1	6.7
Polk	372.4	25.1	20.0	18.9	5.4	0.1	5.0	6.3
Poweshiek	374.5	8.3	8.1	29.7	2.2	--	0.2	4.1
Story	367.0	10.8	10.3	26.4	2.8	--	0.5	3.3
Van Buren	309.5	58.5	55.8	11.3	18.0	0.1	2.6	12.5
Wapello	277.9	36.5	35.6	14.2	12.8	0.1	0.8	11.2
Warren	366.5	42.2	41.0	13.2	11.2	0.2	1.0	13.5
Washington	364.9	23.6	22.3	17.9	6.1	0.1	1.2	7.7
Wayne	336.9	21.2	19.2	19.3	5.7	0.1	1.9	8.9
Webster	459.6	21.0	18.9	19.5	4.1	--	2.1	4.0
Total	11,264.3	1,003.7	946.8	2.8	8.4	2.8	54.1	278.6

(Table 1 continued on next page)

*Indicates that the sampling error was greater than 50 percent.

(Table 1 continued)

		Forest land						
Unit and county	Land area	All forest land	Timber-land	Sampling error for timberland	Timberland as a percent of land area	Other forest land	Reserved forest land	Nonforest land with trees
	Thousand acres			*Percent*		*Thousand acres*		
Western Unit								
Adair	364.5	7.4	7.0	32.0	1.9	0.2	0.2	2.2
Adams	272.0	9.0	8.7	28.7	3.2	0.1	0.2	3.3
Audubon	284.5	2.5	2.5	*	0.9	--	--	1.5
Buena Vista	367.8	3.1	3.1	48.1	0.8	--	--	0.4
Calhoun	365.6	0.9	0.9	*	0.2	--	--	0.4
Carroll	364.8	3.2	3.1	48.1	0.8	0.1	--	0.7
Cass	361.5	6.3	5.9	34.8	1.6	0.1	0.3	3.8
Cerro Gordo	364.4	1.6	1.6	*	0.4	--	--	1.0
Cherokee	369.3	8.6	8.6	28.9	2.3	--	--	0.9
Clay	363.9	4.9	4.9	38.2	1.3	--	--	0.6
Crawford	457.2	7.9	7.8	30.3	1.7	0.1	--	2.8
Dickinson	243.6	0.9	0.9	*	0.4	--	--	0.1
Emmet	252.0	2.3	2.3	*	0.9	--	--	0.8
Franklin	372.9	4.5	4.5	39.9	1.2	--	--	1.0
Fremont	329.5	17.6	15.6	21.4	4.7	0.4	1.6	3.9
Greene	365.6	10.1	9.5	27.5	2.6	0.4	0.2	1.2
Hancock	365.4	1.2	1.2	*	0.3	--	--	0.6
Harrison	446.4	28.5	27.1	16.3	6.1	0.9	0.5	4.4
Humboldt	279.4	3.0	3.0	48.9	1.1	--	--	1.0
Ida	276.4	0.4	0.4	*	0.1	--	--	0.2
Kossuth	623.3	5.0	5.0	37.9	0.8	--	--	1.5
Lyon	376.1	4.6	4.6	39.5	1.2	--	--	0.4
Mills	281.1	11.6	11.2	25.3	4.0	0.1	0.3	3.0
Monona	446.1	32.6	30.1	15.4	6.7	1.0	1.5	6.4
Montgomery	271.2	6.2	5.0	37.9	1.8	0.1	1.1	1.7
O'Brien	367.0	2.7	2.7	*	0.7	--	--	0.2
Osceola	255.0	0.2	0.2	*	0.1	--	--	--
Page	342.6	7.1	6.6	32.9	1.9	0.1	0.4	4.1
Palo Alto	359.5	2.6	2.6	*	0.7	--	--	0.4
Plymouth	553.0	7.6	7.6	30.7	1.4	--	--	1.2
Pocahontas	369.2	1.1	1.1	*	0.3	--	--	0.4
Pottawattamie	610.1	19.2	17.9	20.0	2.9	0.3	1.0	7.5
Ringgold	342.7	16.5	16.1	21.1	4.7	0.1	0.3	6.7
Sac	368.9	2.7	2.7	*	0.7	--	--	0.7
Shelby	378.2	2.6	2.4	*	0.6	--	0.2	1.6
Sioux	492.0	3.0	3.0	48.9	0.6	--	--	0.3
Taylor	343.7	10.1	9.5	27.5	2.8	--	0.6	5.2
Union	272.5	17.2	16.5	20.8	6.1	0.4	0.3	5.6
Winnebago	256.5	0.9	0.9	*	0.4	--	--	0.4
Woodbury	559.0	18.1	16.6	20.8	3.0	0.4	1.1	4.3
Worth	256.6	4.9	4.9	38.2	1.9	--	--	0.5
Wright	370.3	4.5	4.5	39.9	1.2	--	--	0.6
Total	15,361.3	304.9	290.3	5.0	1.9	4.8	9.8	83.5
All counties	35,817.0	2,050.2	1,943.5	1.9	5.4	18.9	87.8	522.0

*Indicates that the sampling error was greater than 50 percent.

Table 2.--Area of timberland by Forest Survey Unit and ownership class, Iowa, 1990

(In thousand acres)

Forest Survey Unit	All owners	Ownership class		
		Public owners	Farmer	Miscellaneous private
Northeastern Unit	706.4	54.1	517.5	134.8
Southeastern Unit	946.8	64.5	549.2	333.1
Western Unit	290.3	37.2	175.4	77.7
All Units	1,943.5	155.8	1,242.1	545.6

Table 3.--Area of timberland by Forest Survey Unit and forest type, Iowa, 1990

(In thousand acres)

Forest Survey Unit	All types	Forest type									
		Eastern redcedar	Eastern redcedar-hardwood	Other softwoods	White oak-red oak-hickory	White oak	Bur oak	Elm-ash-soft maple	Cotton-wood-aspen	Maple-basswood	Non-stocked
Northeastern Unit	706.4	9.2	11.6	6.3	238.0	15.9	20.1	148.2	10.0	244.4	2.7
Southeastern Unit	946.8	3.9	7.3	--	414.2	69.3	27.1	227.7	8.3	189.0	--
Western Unit	290.3	10.6	5.0	--	68.6	2.5	37.6	97.0	10.8	58.2	--
All Units	1,943.5	23.7	23.9	6.3	720.8	87.7	84.8	472.9	29.1	491.6	2.7

Table 4.--Area of timberland by Forest Survey Unit and stand-size class, Iowa, 1990

(In thousand acres)

Forest Survey Unit	All stands	Stand-size class Sawtimber	Poletimber	Seedling & sapling	Nonstocked
Northeastern Unit	706.4	519.3	92.8	91.6	2.7
Southeastern Unit	946.8	589.8	182.5	174.5	--
Western Unit	290.3	155.6	112.0	22.7	--
All Units	1,943.5	1,264.7	387.3	288.8	2.7

Table 5--Area of timberland by Forest Survey Unit and potential productivity class, Iowa,1990

(In thousand acres)

Forest Survey Unit	All classes	Potential productivity class (cubic feet of growth per acre per year) 165+	120-164	85-119	50-84	20-49
Northeastern Unit	706.4	3.2	29.8	250.5	309.3	113.6
Southeastern Unit	946.8	12.3	24.5	254.9	485.1	170.0
Western Unit	290.3	7.1	5.4	67.8	117.0	93.0
All Units	1,943.5	22.6	59.7	573.2	911.4	376.6

Table 6.--Area of timberland by Forest Survey Unit and stocking class of growing-stock trees, Iowa, 1990

(In thousand acres)

Forest Survey Unit	All classes	Stocking percent of growing-stock trees Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
Northeastern Unit	706.4	16.2	210.9	399.5	76.6	3.2
Southeastern Unit	946.8	22.8	364.0	411.4	142.5	6.1
Western Unit	290.3	5.4	171.2	88.5	23.0	2.2
All Units	1,943.5	44.4	746.1	899.4	242.1	11.5

Table 7.--Area of timberland by ownership class, stocking class of growing-stock trees, and Forest Survey Unit, Iowa, 1990

(In thousand acres)

Ownership class	All classes	Stocking percent of growing-stock trees				
		Nonstocked	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
All Units						
Public	155.8	8.4	46.8	75.4	25.2	--
Farmer	1,242.1	19.8	547.1	545.0	124.1	6.1
Miscellaneous private	545.6	16.2	152.2	279.0	92.8	5.4
All owners	1,943.5	44.4	746.1	899.4	242.1	11.5
Northeastern Unit						
Public	54.1	2.7	27.4	14.4	9.6	--
Farmer	517.5	9.5	170.7	296.8	40.5	--
Miscellaneous private	134.8	4.0	12.8	88.3	26.5	3.2
All owners	706.4	16.2	210.9	399.5	76.6	3.2
Southeastern Unit						
Public	64.5	3.1	3.1	45.1	13.2	--
Farmer	549.2	7.5	255.6	204.1	75.9	6.1
Miscellaneous private	333.1	12.2	105.3	162.2	53.4	--
All owners	946.8	22.8	364.0	411.4	142.5	6.1
Western Unit						
Public	37.2	2.6	16.3	15.9	2.4	--
Farmer	175.4	2.8	120.8	44.1	7.7	--
Miscellaneous private	77.7	--	34.1	28.5	12.9	2.2
All owners	290.3	5.4	171.2	88.5	23.0	2.2

Table 8.--Area of timberland by forest type, ownership class, and Forest Survey Unit, Iowa, 1990

(In thousand acres)

		Ownership class		
Forest type	All owners	Public	Farmer	Miscellaneous private
All Units				
Eastern redcedar	23.7	--	10.8	12.9
E. redcedar-hardwood	23.9	--	17.6	6.3
Other softwoods	6.3	6.3	--	--
White-red oak-hickory	720.8	38.9	459.6	222.3
White oak	87.7	8.1	47.0	32.6
Bur oak	84.8	2.7	66.7	15.4
Elm-ash-cottonwood	472.9	74.5	269.0	129.4
Cottonwood-aspen	29.1	2.1	13.5	13.5
Maple-basswood	491.6	20.5	357.9	113.2
Nonstocked	2.7	2.7	--	--
All types	1,943.5	155.8	1,242.1	545.6
Northeastern Unit				
Eastern redcedar	9.2	--	2.4	6.8
E. redcedar-hardwood	11.6	--	9.0	2.6
Other softwoods	6.3	6.3	--	--
White-red oak-hickory	238.0	18.2	179.9	39.9
White oak	15.9	--	15.9	--
Bur oak	20.1	--	20.1	--
Elm-ash-cottonwood	148.2	20.1	93.5	34.6
Cottonwood-aspen	10.0	--	7.3	2.7
Maple-basswood	244.4	6.8	189.4	48.2
Nonstocked	2.7	2.7	--	--
All types	706.4	54.1	517.5	134.8
Southeastern Unit				
Eastern redcedar	3.9	--	--	3.9
E. redcedar-hardwood	7.3	--	3.6	3.7
Other softwoods	--	--	--	--
White-red oak-hickory	414.2	20.7	243.4	150.1
White oak	69.3	8.1	31.1	30.1
Bur oak	27.1	2.7	16.3	8.1
Elm-ash-cottonwood	227.7	21.4	125.4	80.9
Cottonwood-aspen	8.3	2.1	6.2	--
Maple-basswood	189.0	9.5	123.2	56.3
Nonstocked	--	--	--	--
All types	946.8	64.5	549.2	333.1
Western Unit				
Eastern redcedar	10.6	--	8.4	2.2
E. redcedar-hardwood	5.0	--	5.0	--
Other softwoods	--	--	--	--
White-red oak-hickory	68.6	--	36.3	32.3
White oak	2.5	--	--	2.5
Bur oak	37.6	--	30.3	7.3
Elm-ash-cottonwood	97.0	33.0	50.1	13.9
Cottonwood-aspen	10.8	--	--	10.8
Maple-basswood	58.2	4.2	45.3	8.7
Nonstocked	--	--	--	--
All types	290.3	37.2	175.4	77.7

Table 9.--Area of timberland by forest type, stand-size class, and Forest Survey Unit, Iowa, 1990

(In thousand acres)

		Stand-size class			
Forest type	All stands	Sawtimber	Poletimber	Seedling & sapling	Nonstocked
All Units					
Eastern redcedar	23.7	8.4	11.4	3.9	--
E. redcedar-hardwood	23.9	14.4	3.2	6.3	--
Other softwoods	6.3	--	--	6.3	--
White-red oak-hickory	720.8	487.3	155.2	78.3	--
White oak	87.7	70.4	17.3	--	--
Bur oak	84.8	64.2	17.8	2.8	--
Elm-ash-cottonwood	472.9	327.1	91.7	54.1	--
Cottonwood-aspen	29.1	21.8	--	7.3	--
Maple-basswood	491.6	271.1	90.7	129.8	--
Nonstocked	2.7	--	--	--	2.7
All types	1,943.5	1,264.7	387.3	288.8	2.7
Northeastern Unit					
Eastern redcedar	9.2	--	9.2	--	--
E. redcedar-hardwood	11.6	5.3	--	6.3	--
Other softwoods	6.3	--	--	6.3	--
White-red oak-hickory	238.0	207.2	25.5	5.3	--
White oak	15.9	15.9	0.0	--	--
Bur oak	20.1	20.1	0.0	--	--
Elm-ash-cottonwood	148.2	103.4	22.2	22.6	--
Cottonwood-aspen	10.0	2.7	0.0	7.3	--
Maple-basswood	244.4	164.7	35.9	43.8	--
Nonstocked	2.7	--	--	--	2.7
All types	706.4	519.3	92.8	91.6	2.7
Southeastern Unit					
Eastern redcedar	3.9	--	--	3.9	--
E. redcedar-hardwood	7.3	7.3	--	--	--
Other softwoods	--	--	--	--	--
White-red oak-hickory	414.2	254.1	96.2	63.9	--
White oak	69.3	54.5	14.8	--	--
Bur oak	27.1	24.4	2.7	--	--
Elm-ash-cottonwood	227.7	166.4	32.6	28.7	--
Cottonwood-aspen	8.3	8.3	--	--	--
Maple-basswood	189.0	74.8	36.2	78.0	--
Nonstocked	--	--	--	--	--
All types	946.8	589.8	182.5	174.5	--
Western Unit					
Eastern redcedar	10.6	8.4	2.2	--	--
E. redcedar-hardwood	5.0	1.8	3.2	--	--
Other softwoods	--	--	--	--	--
White-red oak-hickory	68.6	26.0	33.5	9.1	--
White oak	2.5	--	2.5	--	--
Bur oak	37.6	19.7	15.1	2.8	--
Elm-ash-cottonwood	97.0	57.3	36.9	2.8	--
Cottonwood-aspen	10.8	10.8	--	--	--
Maple-basswood	58.2	31.6	18.6	8.0	--
Nonstocked	--	--	--	--	--
All types	290.3	155.6	112.0	22.7	--

Table 10.--Number of all live trees on timberland by species group and diameter class, Iowa, 1990

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height) 1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods													
Eastern redcedar	24,912	9,723	6,936	4,797	1,794	1,037	392	128	55	22	22	6	--
Other softwoods	659	--	378	109	107	50	--	9	--	6	--	--	--
Total	25,571	9,723	7,314	4,906	1,901	1,087	392	137	55	28	22	6	--
Hardwoods													
Select white oak	52,792	9,933	8,016	7,242	7,635	5,390	4,502	3,085	2,331	1,837	1,070	1,514	237
Other white oak	392	--	--	93	144	109	15	9	14	--	8	--	--
Select red oak	17,162	3,906	1,989	1,619	1,521	1,560	1,676	1,566	1,256	786	496	670	117
Other red oak	19,295	6,780	2,499	2,817	2,197	1,368	1,153	985	609	423	167	262	35
Select hickory	53,615	21,741	14,379	7,964	4,471	2,212	1,409	820	300	197	57	65	--
Other hickory	29,077	17,034	6,177	2,559	1,630	879	343	277	84	47	47	--	--
Basswood	36,563	21,027	5,013	2,559	2,059	1,744	1,588	780	725	489	230	305	44
Hard maple	16,165	9,618	1,869	1,367	803	728	575	381	367	192	110	137	18
Soft maple	28,268	9,435	5,397	3,112	2,713	2,141	1,649	1,239	763	558	402	675	184
Elm	191,502	116,739	38,790	18,452	8,175	4,507	2,777	1,155	428	245	127	105	2
Ash	33,005	16,413	7,995	3,287	1,901	1,354	901	410	247	165	116	199	17
Cottonwood	8,201	3,357	921	398	700	395	502	370	345	221	216	550	226
Willow	13,973	8,058	1,056	1,137	1,105	806	613	472	265	168	153	130	10
Hackberry	44,835	24,276	10,443	4,543	2,368	1,583	646	539	166	91	79	81	20
Aspen	6,497	3,495	987	528	308	422	395	217	108	24	13	--	--
Birch	4,241	1,188	771	760	563	231	194	260	160	71	15	20	8
Black cherry	25,785	15,792	4,344	2,411	1,503	726	576	236	129	38	9	20	1
Black walnut	16,774	6,297	2,553	2,032	1,519	1,608	1,196	795	340	198	156	80	--
Other hardwoods	69,049	34,176	14,754	7,603	4,791	3,423	2,057	1,004	518	266	230	180	47
Noncommercial sp.	137,385	101,313	27,789	5,944	1,555	649	98	--	30	--	--	7	--
Total	804,576	430,578	155,742	76,427	47,661	31,835	22,865	14,600	9,185	6,016	3,701	5,000	966
All species	830,147	440,301	163,056	81,333	49,562	32,922	23,257	14,737	9,240	6,044	3,723	5,006	966

Table 11.--Number of growing-stock trees on timberland by species group and diameter class, Iowa, 1990

(In thousand trees)

		Diameter class (inches at breast height)										
Species group	All classes	1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods													
Eastern redcedar	20,518	9,723	5,700	3,436	1,038	438	142	19	--	16	--	6	--
Other softwoods	419	--	378	--	32	--	--	9	--	--	--	--	--
Total	20,937	9,723	6,078	3,436	1,070	438	142	28	--	16	--	6	--
Hardwoods													
Select white oak	37,938	9,933	5,658	4,741	5,287	3,572	2,751	2,068	1,536	1,164	555	642	31
Other white oak	271	--	--	93	105	42	15	9	7	--	--	--	--
Select red oak	14,636	3,906	1,896	1,570	1,066	1,312	1,282	1,267	979	578	326	410	44
Other red oak	15,628	6,780	2,172	1,901	1,302	1,022	785	721	443	251	93	149	9
Select hickory	50,108	21,741	13,488	6,981	3,751	1,973	1,068	652	223	154	37	40	--
Other hickory	27,166	17,034	5,217	2,297	1,257	732	298	204	60	42	25	--	--
Basswood	32,483	21,027	4,083	1,835	1,434	1,247	1,157	579	541	332	130	115	3
Hard maple	14,658	9,618	1,602	1,166	602	551	424	232	248	107	59	49	--
Soft maple	22,073	9,435	4,206	2,154	1,587	1,239	1,005	855	523	354	244	420	51
Elm	169,883	116,424	30,732	12,484	5,088	2,318	1,668	689	267	116	54	41	2
Ash	27,763	16,314	5,334	2,373	1,517	956	562	345	160	61	74	64	3
Cottonwood	7,619	3,261	804	294	679	395	446	331	310	216	202	526	155
Willow	11,528	8,058	693	710	639	523	323	269	125	80	56	49	3
Hackberry	40,943	24,192	8,973	3,542	1,894	1,177	383	444	136	79	62	59	2
Aspen	5,784	3,495	783	270	252	399	322	153	82	15	13	--	--
Birch	3,626	1,188	771	551	384	188	143	222	104	50	10	11	4
Black cherry	20,628	15,792	2,298	1,021	631	316	321	148	77	13	5	6	--
Black walnut	13,616	6,297	1,944	1,322	987	1,088	833	592	250	156	116	31	--
Other hardwoods	45,110	33,825	7,644	1,612	910	501	279	170	50	27	52	36	4
Total	561,461	328,320	98,298	46,917	29,372	19,551	14,065	9,950	6,121	3,795	2,113	2,648	311
All species	582,398	338,043	104,376	50,353	30,442	19,989	14,207	9,978	6,121	3,811	2,113	2,654	311

Table 12.--Net volume of timber on timberland by class of timber and major species group, Iowa, 1990

(In thousand cubic feet)

Class of timber	All species	Major species group Softwoods	 Soft hardwoods	 Hard hardwoods
Live trees				
Growing-stock trees				
Sawtimber				
Saw-log portion	1,062,182	5,410	445,232	611,540
Upper stem portion	158,941	918	60,730	97,293
Total	1,221,123	6,328	505,962	708,833
Poletimber	441,890	11,804	185,156	244,930
All growing-stock trees	1,663,013	18,132	691,118	953,763
Cull trees				
Short-log trees	183,227	1,358	62,825	119,044
Rough trees				
Sawtimber	365,232	10,325	135,557	219,350
Poletimber	215,138	6,617	128,043	80,478
Total	580,370	16,942	263,600	299,828
Rotten trees				
Sawtimber	97,015	--	53,981	43,034
Poletimber	6,409	--	3,796	2,613
Total	103,424	--	57,777	45,647
All cull trees	867,021	18,300	384,202	464,519
All live trees	2,530,034	36,432	1,075,320	1,418,282
Salvable dead trees				
Sawtimber	63,706	116	16,696	46,894
Poletimber	16,032	--	10,919	5,113
Total	79,738	116	27,615	52,007
All classes	2,609,772	36,548	1,102,935	1,470,289

Table 13.--Net volume of growing stock on timberland by species group and diameter class, Iowa, 1990

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods											
Eastern redcedar	17,824	7,012	4,668	3,378	1,679	330	--	473	--	284	--
Other softwoods	308	--	124	--	--	184	--	--	--	--	--
Total	18,132	7,012	4,792	3,378	1,679	514	--	473	--	284	--
Hardwoods											
Select white oak	334,313	11,372	26,411	32,453	40,344	44,769	47,235	47,923	28,944	50,390	4,472
Other white oak	1,689	288	452	367	172	190	220	--	--	--	--
Select red oak	188,537	4,343	6,100	12,914	20,086	28,966	31,119	25,294	17,537	34,795	7,383
Other red oak	89,521	4,253	6,600	8,744	11,631	15,713	14,077	10,792	4,921	11,113	1,677
Select hickory	105,146	15,289	19,190	18,547	17,139	15,289	7,299	7,201	2,238	2,954	--
Other hickory	34,093	5,154	6,451	7,044	4,773	5,002	2,056	2,033	1,580	--	--
Basswood	105,761	4,332	7,923	11,520	17,860	13,565	17,881	14,658	7,927	9,412	683
Hard maple	47,078	2,831	3,347	5,831	7,073	5,889	8,855	5,077	3,725	4,450	--
Soft maple	162,653	5,569	8,840	13,235	16,514	20,788	18,172	16,582	14,322	38,471	10,160
Elm	124,688	24,759	22,781	19,672	23,524	14,273	8,071	4,676	2,836	3,754	342
Ash	56,365	5,194	7,007	9,197	8,681	7,985	5,425	2,791	4,133	5,388	564
Cottonwood	149,622	783	4,095	4,186	7,262	8,420	10,912	10,415	12,782	56,802	33,965
Willow	38,639	1,882	3,548	5,108	5,746	6,542	4,355	3,722	3,448	3,774	514
Hackberry	57,083	7,053	8,474	10,329	5,340	9,377	4,188	3,249	3,260	5,454	359
Aspen	18,569	615	1,502	3,900	5,012	3,477	2,693	677	693	--	--
Birch	19,263	1,025	1,588	1,732	2,060	5,109	3,151	2,102	577	1,231	688
Black cherry	19,309	2,158	2,707	2,884	4,492	3,244	2,484	557	253	530	--
Black walnut	63,115	2,796	4,620	9,382	11,970	12,614	7,524	6,161	5,851	2,197	--
Other hardwoods	29,437	3,349	4,361	3,999	4,142	3,592	1,681	1,111	2,934	3,599	669
Total	1,644,881	103,045	145,997	181,044	213,821	224,804	197,398	165,021	117,961	234,314	61,476
All species	1,663,013	110,057	150,789	184,422	215,500	225,318	197,398	165,494	117,961	234,598	61,476

Table 14.--Net volume of growing stock in the saw-log portion of sawtimber trees on timberland by species group and diameter class, Iowa, 1990

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Eastern redcedar	5,243	2,741	1,473	302	--	451	--	276	--
Other softwoods	167	--	--	167	--	--	--	--	--
Total	5,410	2,741	1,473	469	--	451	--	276	--
Hardwoods									
Select white oak	229,812	--	29,556	36,653	41,241	43,361	26,773	47,880	4,348
Other white oak	458	--	111	155	192	--	--	--	--
Select red oak	147,025	--	15,307	24,244	27,494	23,125	16,342	33,287	7,226
Other red oak	60,385	--	8,586	12,898	12,346	9,812	4,560	10,545	1,638
Select hickory	42,238	--	12,263	12,334	6,297	6,498	2,067	2,779	--
Other hickory	12,637	--	3,440	4,097	1,788	1,842	1,470	--	--
Basswood	71,594	--	13,638	11,454	15,905	13,467	7,454	9,006	670
Hard maple	30,255	--	5,253	4,879	7,794	4,615	3,472	4,242	--
Soft maple	120,405	--	12,225	17,164	15,954	15,076	13,297	36,743	9,946
Elm	45,734	--	16,606	11,440	6,962	4,197	2,614	3,581	334
Ash	29,640	--	6,325	6,544	4,748	2,528	3,832	5,117	546
Cottonwood	132,400	--	5,595	7,175	9,743	9,612	12,032	54,829	33,414
Willow	23,346	--	4,047	5,128	3,699	3,302	3,156	3,518	496
Hackberry	26,439	--	3,774	7,554	3,626	2,914	3,009	5,211	351
Aspen	10,123	--	3,674	2,836	2,361	613	639	--	--
Birch	12,433	--	1,407	4,092	2,683	1,876	531	1,178	666
Black cherry	8,979	--	3,043	2,569	2,134	498	230	505	--
Black walnut	37,950	--	8,449	10,093	6,471	5,493	5,370	2,074	--
Other hardwoods	14,919	--	2,877	2,816	1,451	991	2,697	3,435	652
Total	1,056,772	--	156,176	184,125	172,889	149,820	109,545	223,930	60,287
All species	1,062,182	2,741	157,649	184,594	172,889	150,271	109,545	224,206	60,287

Table 15.--Net volume of sawtimber on timberland by species group and diameter class, Iowa, 1990

(In thousand board feet) [1]

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Eastern redcedar	32,305	18,667	8,723	1,616	--	2,114	--	1,185	--
Other softwoods	938	--	--	938	--	--	--	--	--
Total	33,243	18,667	8,723	2,554	--	2,114	--	1,185	--
Hardwoods									
Select white oak	1,232,753	--	198,280	216,898	224,615	223,398	132,249	219,926	17,387
Other white oak	2,876	--	860	908	1,108	--	--	--	--
Select red oak	810,358	--	99,400	144,347	155,547	126,022	86,805	166,772	31,465
Other red oak	341,730	--	57,542	77,816	69,590	53,042	24,019	52,728	6,993
Select hickory	252,491	--	82,767	74,132	35,427	34,972	10,867	14,326	--
Other hickory	76,921	--	23,731	24,913	10,249	10,159	7,869	--	--
Basswood	407,601	--	90,377	68,271	89,372	72,631	38,803	45,174	2,973
Hard maple	166,547	--	33,829	28,197	42,474	24,114	17,538	20,395	--
Soft maple	580,659	--	71,771	91,091	79,879	72,847	62,645	164,298	38,128
Elm	262,117	--	110,342	65,950	36,379	20,709	12,280	15,266	1,191
Ash	162,679	--	39,314	37,000	25,554	13,260	19,720	25,347	2,484
Cottonwood	693,394	--	34,120	40,934	54,547	52,995	65,917	290,758	154,123
Willow	124,366	--	26,020	29,544	19,561	16,430	15,243	15,643	1,925
Hackberry	138,996	--	24,938	43,344	18,898	14,416	13,991	22,210	1,199
Aspen	60,576	--	23,212	16,955	13,614	3,409	3,386	--	--
Birch	67,365	--	9,497	23,448	14,411	9,514	2,570	5,159	2,766
Black cherry	52,809	--	20,652	14,888	11,333	2,514	1,149	2,273	--
Black walnut	220,639	--	57,819	60,731	36,037	29,079	27,229	9,744	--
Other hardwoods	80,114	--	19,073	16,488	7,663	5,024	13,108	16,222	2,536
Total	5,734,991	--	1,023,544	1,075,855	946,258	784,535	555,388	1,086,241	263,170
All species	5,768,234	18,667	1,032,267	1,078,409	946,258	786,649	555,388	1,087,426	263,170

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[1] International 1/4-inch rule.

Table 16.--Net volume and sampling error of growing stock and sawtimber on timberland by county, Iowa, 1990

	Growing stock		Sawtimber	
Unit and county	Volume	Sampling error	Volume	Sampling error
	Thousand cubic feet	*Percent*	*Thousand board feet*[1]	*Percent*
Northeastern Unit				
Allamakee	89,454	14.0	311,526	16.8
Benton	12,014	38.1	42,622	45.4
Black Hawk	9,607	42.6	33,255	*
Bremer	13,562	35.9	50,096	41.9
Buchanan	12,135	37.9	44,874	44.2
Butler	7,843	47.2	24,089	*
Cedar	17,968	31.2	64,860	36.8
Chickasaw	6,169	*	20,112	*
Clayton	103,951	13.0	393,011	14.9
Clinton	28,001	25.0	105,331	28.9
Delaware	21,651	28.4	81,154	32.9
Dubuque	45,943	19.5	168,949	22.8
Fayette	36,161	22.0	134,496	25.5
Floyd	4,795	*	16,986	*
Grundy	168	*	1,253	*
Howard	7,248	49.1	26,745	*
Jackson	65,507	16.3	236,834	19.2
Johnson	27,024	25.4	99,188	29.7
Jones	27,605	25.2	98,997	29.8
Linn	42,261	20.3	156,017	23.7
Mitchell	7,344	48.8	26,928	*
Scott	7,978	46.8	27,607	*
Tama	19,149	30.2	67,102	36.2
Winneshiek	45,667	19.6	167,761	22.9
Total	659,205	5.1	2,399,793	6.0
Southeastern Unit				
Appanoose	26,934	25.5	91,044	31.0
Boone	23,399	27.3	82,966	32.5
Clarke	21,653	28.4	66,701	36.3
Dallas	15,425	33.6	48,120	42.7
Davis	32,460	23.2	111,830	28.0
Decatur	35,333	22.2	121,247	26.9
Des Moines	42,994	20.2	152,936	24.0
Guthrie	26,349	25.7	91,892	30.9
Hamilton	6,639	*	23,674	*
Hardin	11,883	38.3	43,521	44.9
Henry	31,048	23.7	111,090	28.1
Iowa	20,506	29.2	68,588	35.8
Jasper	11,620	38.8	37,065	48.7
Jefferson	16,495	32.5	50,500	41.7
Keokuk	28,893	24.6	105,650	28.8
Lee	49,835	18.7	152,711	24.0
Louisa	28,118	24.9	102,446	29.3
Lucas	24,212	26.9	81,495	32.8
Madison	38,258	21.4	132,753	25.7
Mahaska	17,201	31.9	59,503	38.4
Marion	29,729	24.2	103,380	29.1
Mashall	11,841	38.4	42,768	45.3
Monroe	33,820	22.7	99,955	29.6
Muscatine	17,092	32.0	52,457	40.9
Polk	17,393	31.7	61,583	37.7
Poweshiek	5,667	*	16,277	*
Story	7,788	47.4	23,882	*
Van Buren	48,780	18.9	172,394	22.6
Wapello	27,592	25.2	85,587	32.0
Warren	31,377	23.6	107,518	28.6
Washington	17,666	31.4	57,880	38.9
Wayne	11,992	38.2	39,464	47.2
Webster	16,879	32.2	55,517	39.8
Total	786,871	4.7	2,654,394	5.7

[1] International 1/4-inch rule.

(Table 16 continued on next page)

*Indicates that the sampling error was greater than 50 percent

(Table 16 continued)

Unit and county	Growing stock		Sawtimber	
	Volume	Sampling error	Volume	Sampling error
	Thousand cubic feet	*Percent*	*Thousand board feet*[1]	*Percent*
Western Unit				
Adair	4,537	*	13,654	*
Adams	5,828	*	18,775	*
Audubon	1,785	*	5,850	*
Buena Vista	2,326	*	7,358	*
Calhoun	660	*	873	*
Carroll	3,228	*	12,073	*
Cass	3,576	*	11,348	*
Cerro Gordo	1,668	*	4,795	*
Cherokee	5,734	*	17,121	*
Clay	3,438	*	10,529	*
Crawford	7,103	49.6	25,667	*
Dickinson	408	*	375	*
Emmet	2,156	*	6,488	*
Franklin	3,963	*	11,368	*
Fremont	10,760	40.3	32,980	*
Greene	9,571	42.7	36,298	49.2
Hancock	1,147	*	2,554	*
Harrison	24,368	26.8	86,391	31.9
Humboldt	2,869	*	8,508	*
Ida	247	*	316	*
Kossuth	3,980	*	12,869	*
Lyon	3,187	*	9,107	*
Mills	8,027	46.6	25,984	*
Monona	25,071	26.4	88,195	31.5
Montgomery	3,677	*	13,567	*
O'Brien	2,572	*	9,328	*
Osceola	206	*	886	*
Page	3,777	*	12,264	*
Palo Alto	1,810	*	5,642	*
Plymouth	5,937	*	18,558	*
Pocahontas	1,008	*	3,758	*
Pottawattamie	11,634	38.7	38,428	47.8
Ringgold	8,590	45.1	23,841	*
Sac	1,685	*	5,260	*
Shelby	1,575	*	5,299	*
Sioux	2,338	*	8,581	*
Taylor	4,322	*	12,715	*
Union	10,242	41.3	30,808	*
Winnebago	907	*	3,349	*
Woodbury	12,578	37.3	41,655	45.9
Worth	4,513	*	18,064	*
Wright	4,382	*	13,775	*
Total	217,390	9.0	715,254	11.1
All counties	1,663,466	3.2	5,769,441	3.9

[1] International 1/4-inch rule.

*Indicates that the sampling error was greater than 50 percent.

Table 17.--Net volume of live trees and growing stock on timberland by ownership class and major species group, Iowa, 1990

(In thousand cubic feet)

	Live trees				Growing-stock trees			
Ownership class	All species	Softwoods	Soft hardwoods	Hard hardwoods	All species	Softwoods	Soft hardwoods	Hard hardwoods
Public	234,911	879	131,810	102,222	163,769	--	89,402	74,367
Farmer	1,551,793	24,964	621,422	905,407	988,572	12,031	382,333	594,208
Miscellaneous private	743,330	10,589	322,088	410,653	510,672	6,101	219,383	285,188
All owners	2,530,034	36,432	1,075,320	1,418,282	1,663,013	18,132	691,118	953,763

Table 18.--Net volume of sawtimber on timberland by species group and tree grade, Iowa, 1990

(In thousand board feet)[1]

Species group	All grades	Tree grade			
		1	2	3	Tie and timber
Softwoods					
Eastern redcedar	32,305	--	--	32,305	--
Other softwoods	938	--	--	938	--
Total	33,243	--	--	33,243	--
Hardwoods					
Select white oak	1,232,753	98,431	224,636	363,208	546,478
Other white oak	2,876	--	--	--	2,876
Select red oak	810,358	122,849	236,192	325,945	125,372
Other red oak	341,730	38,152	53,800	137,550	112,228
Select hickory	252,491	7,570	53,810	99,208	91,903
Other hickory	76,921	11,125	11,612	34,010	20,174
Basswood	407,601	69,839	139,632	186,105	12,024
Hard maple	166,547	7,118	24,069	80,131	55,228
Soft maple	580,659	31,089	116,059	247,703	185,808
Elm	262,117	2,492	45,703	100,518	113,405
Ash	162,679	17,673	35,241	76,733	33,032
Cottonwood	693,394	216,239	185,201	245,184	46,770
Willow	124,366	6,221	11,639	63,462	43,044
Hackberry	138,996	18,586	49,159	58,231	13,020
Aspen	60,576	--	6,994	7,950	45,632
Birch	67,365	6,832	6,216	20,801	33,516
Black cherry	52,809	5,089	3,755	36,236	7,729
Black walnut	220,639	36,168	73,530	90,042	20,899
Other hardwoods	80,114	6,134	3,201	32,309	38,470
Total	5,734,991	701,607	1,280,451	2,205,326	1,547,607
All species	5,768,234	701,607	1,280,451	2,238,569	1,547,607

[1] International 1/4-inch rule.

Table 19.--Average net annual growth of growing stock and sawtimber on timberland by Forest Survey Unit and major species group, Iowa, 1974-1989

Unit	Growing stock				Sawtimber			
	All species	Softwoods	Soft hardwoods	Hard hardwoods	All species	Softwoods	Soft hardwoods	Hard hardwoods
	Thousand cubic feet				Thousand board feet[1]			
Northeastern Unit	16,716	602	7,403	8,711	80,530	626	31,603	48,301
Southeastern Unit	21,418	136	11,291	9,991	94,392	559	41,685	52,148
Western Unit	5,884	115	3,970	1,799	21,966	466	13,483	8,017
All Units	44,018	853	22,664	20,501	196,888	1,651	86,771	108,466

[1] International 1/4-inch rule.

Table 20.--Average annual removals of growing stock and sawtimber on timberland by Forest Survey Unit and major species group, Iowa, 1974-1989

Unit	Growing stock				Sawtimber			
	All species	Softwoods	Soft hardwoods	Hard hardwoods	All species	Softwoods	Soft hardwoods	Hard hardwoods
	Thousand cubic feet				Thousand board feet[1]			
Northeastern Unit	10,813	30	4,050	6,733	42,836	77	14,630	28,129
Southeastern Unit	10,347	128	5,028	5,191	37,268	397	18,419	18,452
Western Unit	2,947	--	2,187	760	10,340	--	8,232	2,108
All Units	24,107	158	11,265	12,684	90,444	474	41,281	48,689

[1] International 1/4-inch rule.

Table 21.--Average net annual growth and average annual removals of growing stock on timberland by species group and Forest Survey Unit, Iowa, 1974-1989

(In thousand cubic feet)

	All Units		Northeastern Unit		Southeastern Unit		Western Unit	
Species group	Growth	Removals	Growth	Removals	Growth	Removals	Growth	Removals
Softwoods								
Eastern redcedar	719	158	468	30	136	128	115	--
Other softwoods	134	--	134	--	--	--	--	--
Total	853	158	602	30	136	128	115	--
Hardwoods								
Select white oak	5,535	5,280	1,906	2,207	3,121	2,596	508	477
Other white oak	-6	--	--	--	-6	--	--	--
Select red oak	3,766	2,809	2,087	1,990	1,678	770	1	49
Other red oak	2,467	1,018	631	330	1,734	657	102	31
Select hickory	2,705	1,102	912	716	1,519	359	274	27
Other hickory	1,081	255	470	128	518	104	93	23
Basswood	2,417	547	1,387	547	849	--	181	--
Hard maple	709	786	688	757	21	29	--	--
Soft maple	6,360	3,879	2,106	923	3,993	2,536	261	420
Elm	5,187	2,071	1,695	1,477	2,295	227	1,197	367
Ash	1,611	677	942	392	357	217	312	68
Cottonwood	3,725	2,701	653	354	1,809	1,306	1,263	1,041
Willow	659	625	-177	64	650	369	186	192
Hackberry	3,251	456	845	71	1,702	295	704	90
Aspen	233	200	213	200	20	--	--	--
Birch	-139	34	-29	34	-110	--	--	--
Black cherry	709	315	530	256	162	59	17	--
Black walnut	2,257	553	960	256	832	227	465	70
Other hardwoods	638	641	295	81	138	468	205	92
Total	43,165	23,949	16,114	10,783	21,282	10,219	5,769	2,947
All species	44,018	24,107	16,716	10,813	21,418	10,347	5,884	2,947

Table 22.--Average net annual growth and average annual removals of sawtimber on timberland by species group and Forest Survey Unit, Iowa, 1974-1989

(In thousand board feet)[1]

	All Units		Northeastern Unit		Southeastern Unit		Western Unit	
Species group	Growth	Removals	Growth	Removals	Growth	Removals	Growth	Removals
Softwoods								
Eastern redcedar	1,591	474	566	77	559	397	466	--
Other softwoods	60	--	60	--	--	--	--	--
Total	1,651	474	626	77	559	397	466	--
Hardwoods								
Select white oak	35,928	20,441	12,685	8,676	19,512	10,629	3,731	1,136
Other white oak	63	--	--	--	63	--	--	--
Select red oak	24,630	12,505	13,180	9,587	10,937	2,693	513	225
Other red oak	12,869	3,100	3,555	1,100	8,922	1,905	392	95
Select hickory	9,027	3,380	3,753	2,609	4,587	639	687	132
Other hickory	2,637	723	1,044	297	1,443	313	150	113
Basswood	13,067	2,248	6,478	2,248	5,320	--	1,269	--
Hard maple	5,074	3,205	4,564	3,134	510	71	--	--
Soft maple	28,821	14,432	9,068	3,297	18,139	9,521	1,614	1,614
Elm	7,583	6,950	4,942	5,155	2,771	542	-130	1,253
Ash	5,747	2,676	3,388	1,781	1,404	749	955	146
Cottonwood	20,211	12,699	3,867	1,685	9,693	6,225	6,651	4,789
Willow	3,658	917	296	265	1,823	580	1,539	72
Hackberry	7,951	1,628	2,518	233	3,665	1,090	1,768	305
Aspen	2,119	560	2,084	560	35	--	--	--
Birch	786	85	440	85	346	--	--	--
Black cherry	2,441	676	1,998	676	158	--	285	--
Black walnut	9,930	2,177	4,979	1,158	3,524	758	1,427	261
Other hardwoods	2,695	1,568	1,065	213	981	1,156	649	199
Total	195,237	89,970	79,904	42,759	93,833	36,871	21,500	10,340
All species	196,888	90,444	80,530	42,836	94,392	37,268	21,966	10,340

[1] International 1/4-inch rule.

Table 23.--Average net annual growth and average annual removals of growing stock on timberland by ownership class and major species group, Iowa, 1974-1989

(In thousand cubic feet)

	Growth				Removals			
		Species group				Species group		
Ownership class	All species	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Other softwoods	Soft hardwoods	Hard hardwoods
Public	4,813	121	3,152	1,540	4,042	--	2,771	1,271
Farmer	26,011	458	13,121	12,432	14,442	158	5,988	8,296
Other private	13,194	274	6,391	6,529	5,623	--	2,506	3,117
All owners	44,018	853	22,664	20,501	24,107	158	11,265	12,684

Table 24.--Average net annual growth and average annual removals of sawtimber on timberland by ownership class and major species group, Iowa, 1974-1989

(In thousand board feet)[1]

	Growth				Removals			
		Species group				Species group		
Ownership class	All species	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Other softwoods	Soft hardwoods	Hard hardwoods
Public	21,345	--	12,422	8,923	14,431	--	9,678	4,753
Farmer	113,475	1,251	45,977	66,247	53,390	474	21,137	31,779
Other private	62,068	400	28,372	33,296	22,623	--	10,466	12,157
All owners	196,888	1,651	86,771	108,466	90,444	474	41,281	48,689

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[1] International 1/4-inch rule.

Table 25.--Average annual mortality of growing stock and sawtimber on timberland by species group, Iowa, 1974-1989

Species group	Growing stock	Sawtimber
	Thousand cubic feet	*Thousand board feet* [1]
Softwoods		
Eastern redcedar	65	172
Other softwoods	9	--
Total	74	172
Hardwoods		
Select white oak	878	1,863
Other white oak	9	--
Select red oak	1,145	3,993
Other red oak	768	2,479
Select hickory	309	1,015
Other hickory	221	399
Basswood	450	1,525
Hard maple	69	255
Soft maple	1,532	4,628
Elm	5,381	11,417
Ash	616	1,729
Cottonwood	1,195	4,709
Willow	1,356	3,880
Hackberry	194	413
Aspen	351	680
Birch	784	2,613
Black cherry	103	185
Black walnut	168	240
Other hardwoods	505	1,226
Total	16,034	43,249
All species	16,108	43,421

[1] International 1/4-inch rule.

Table 26.--Area of land by land class and Forest Survey Unit, Iowa, 1974 and 1990

(In thousand acres)

	All Units		Northeastern Unit		Southeastern Unit		Western Unit	
Land class	1974	1990	1974	1990	1974	1990	1974	1990
Forest land								
Timberland								
Eastern redcedar	19.7	23.7	7.6	9.2	3.5	3.9	8.6	10.6
Eastern redcedar-hardwood	15.0	23.9	3.8	11.6	6.9	7.3	4.3	5.0
Other softwoods	--	6.3	--	6.3	--	--	--	--
White oak-red oak-hickory	558.3	720.8	188.0	238.0	314.2	414.2	56.1	68.6
White oak	100.1	87.7	22.7	15.9	72.0	69.3	5.4	2.5
Bur oak	72.3	84.8	18.4	20.1	26.7	27.1	27.2	37.6
Elm-ash-soft maple	389.7	472.9	133.5	148.2	182.3	227.7	73.9	97.0
Cottonwood-aspen	21.3	29.1	10.4	10.0	2.6	8.3	8.3	10.8
Maple-basswood	282.3	491.6	200.1	244.4	51.2	189.0	31.0	58.2
Nonstocked	--	2.7	--	2.7	--	--	--	--
Subtotal	1,458.7	1,943.5	584.5	706.4	659.4	946.8	214.8	290.3
Reserved forest land	26.7	87.8	6.9	23.9	5.5	54.1	14.3	9.8
Other forest land	75.9	18.9	23.1	11.3	43.4	2.8	9.4	4.8
All forest land	1,561.3	2,050.2	614.5	741.6	708.3	1,003.7	238.5	304.9
Nonforest land								
Cropland	28,352.9	28,667.1	7,159.4	7,266.2	8,106.6	8,104.0	13,086.9	13,296.9
Pasture	3,305.2	2,251.0	719.2	425.2	1,586.7	1,116.1	999.3	709.7
Other	2,648.2	2,756.4	693.2	733.6	908.0	1,000.6	1,047.0	1,022.2
All nonforest land	34,306.3	33,674.5	8,571.8	8,425.0	10,601.3	10,220.7	15,133.2	15,028.8
Total land	35,867.6	35,724.7	9,186.3	9,166.6	11,309.6	11,224.4	15,371.7	15,333.7
Water[1]	158.0	290.7	59.8	90.6	44.6	114.5	53.6	85.6
Total land and water[1]	36,025.6	36,015.4	9,246.1	9,257.2	11,354.2	11,338.9	15,425.3	15,419.3

[1] Land and water estimates come from the Bureau of Census, 1980.

Table 27.--Area of timberland by county, Iowa, 1974 and 1990

(In thousand acres)

Unit and county	1974	1990	Sampling errors for 1990 estimates
Northeastern Unit			
Allamakee	100.3	100.7	8.4
Benton	14.7	13.8	22.8
Black Hawk	9.8	11.3	25.2
Bremer	12.2	13.9	22.7
Buchanan	10.3	13.2	23.3
Butler	8.8	10.4	26.2
Cedar	15.2	20.1	18.9
Chickasaw	7.8	8.2	29.6
Clayton	82.1	103.5	8.3
Clinton	23.6	27.2	16.2
Delaware	17.1	22.3	17.9
Dubuque	36.7	48.5	12.2
Fayette	27.2	38.2	13.7
Floyd	7.3	6.0	34.6
Grundy	0.6	0.4	*
Howard	6.2	7.9	30.1
Jackson	56.3	71.9	10.0
Johnson	19.1	28.8	15.8
Jones	27.4	28.0	16.0
Linn	28.3	44.4	12.7
Mitchell	4.8	8.9	28.4
Scott	10.4	9.7	27.2
Tama	19.2	21.3	18.3
Winneshiek	39.1	47.8	12.2
Total	584.5	706.4	3.2
Southeastern Unit			
Appanoose	25.2	34.5	14.4
Boone	18.0	24.3	17.2
Clarke	22.2	29.1	15.7
Dallas	17.4	20.3	18.8
Davis	25.9	40.5	13.3
Decatur	28.0	44.3	12.7
Des Moines	25.0	41.3	13.2
Guthrie	24.4	30.0	15.5
Hamilton	6.0	7.6	30.7
Hardin	8.9	12.8	23.7
Henry	21.9	33.0	14.7
Iowa	18.0	22.7	17.8
Jasper	11.3	16.4	20.9
Jefferson	17.6	22.6	17.8
Keokuk	15.8	30.8	15.3
Lee	50.0	59.0	11.0
Louisa	22.2	28.5	15.9
Lucas	29.4	29.3	15.6
Madison	25.4	45.0	12.6
Mahaska	15.1	22.7	17.8
Marion	17.4	38.4	13.7
Marshall	7.9	13.3	23.2
Monroe	34.1	45.2	12.6
Muscatine	18.7	24.0	17.3
Polk	10.1	20.0	18.9
Poweshiek	7.3	8.1	29.7
Story	5.2	10.3	26.4
Van Buren	36.0	55.8	11.3
Wapello	23.0	35.6	14.2
Warren	22.7	41.0	13.2
Washington	17.2	22.3	17.9
Wayne	14.8	19.2	19.3
Webster	17.3	18.9	19.5
Total	659.4	946.8	2.8

(Table 27 continued on next page)

*Indicates that the sampling error was greater than 50 percent.

(Table 27 continued)

Unit and county	1974	1990	Sampling errors for 1990 estimates
Western Unit			
Adair	5.7	7.0	32.0
Adams	7.1	8.7	28.7
Audubon	1.1	2.5	*
Buena Vista	2.1	3.1	48.1
Calhoun	0.5	0.9	*
Carroll	0.5	3.1	48.1
Cass	2.5	5.9	34.8
Cerro Gordo	0.6	1.6	*
Cherokee	4.0	8.6	28.9
Clay	3.4	4.9	38.2
Crawford	4.2	7.8	30.3
Dickinson	0.4	0.9	*
Emmet	2.0	2.3	*
Franklin	2.7	4.5	39.9
Fremont	12.4	15.6	21.4
Greene	5.8	9.5	27.5
Hancock	0.5	1.2	*
Harrison	28.2	27.1	16.3
Humboldt	2.2	3.0	48.9
Ida	0.3	0.4	*
Kossuth	2.3	5.0	37.9
Lyon	1.6	4.6	39.5
Mills	11.9	11.2	25.3
Monona	22.5	30.1	15.4
Montgomery	4.2	5.0	37.9
O'Brien	1.1	2.7	*
Osceola	0.1	0.2	*
Page	6.9	6.6	32.9
Palo Alto	1.4	2.6	*
Plymouth	4.8	7.6	30.7
Pocahontas	0.8	1.1	*
Pottawattamie	12.9	17.9	20.0
Ringgold	14.1	16.1	21.1
Sac	1.4	2.7	*
Shelby	1.6	2.4	*
Sioux	0.7	3.0	48.9
Taylor	9.5	9.5	27.5
Union	14.5	16.5	20.8
Winnebago	0.2	0.9	*
Woodbury	12.6	16.6	20.8
Worth	1.1	4.9	38.2
Wright	2.4	4.5	39.9
Total	214.8	290.3	5.0
All Counties	1,458.7	1,943.5	1.9

*Indicates that the sampling error was greater than 50 percent.

Table 28.--Area of timberland by stand-size class and Forest Survey Unit, Iowa, 1974 and 1990

(In thousand acres)

Unit and stand-size class	1974[1]	1990
All Units		
Sawtimber	854.8	1,264.7
Poletimber	312.2	387.3
Seedling-sapling	291.7	288.8
Nonstocked	--	2.7
Total	1,458.7	1,943.5
Northeastern Unit		
Sawtimber	407.4	519.3
Poletimber	113.4	92.8
Seedling-sapling	63.7	91.6
Nonstocked	--	2.7
Total	584.5	706.4
Southeastern Unit		
Sawtimber	353.6	589.8
Poletimber	148.8	182.5
Seedling-sapling	157.0	174.5
Nonstocked	--	--
Total	659.4	946.8
Western Unit		
Sawtimber	93.8	155.6
Poletimber	50.0	112.0
Seedling-sapling	71.0	22.7
Nonstocked	--	--
Total	214.8	290.3

[1] Data from 1974 have been adjusted to make them comparable to 1990 data.

Table 29.--Area of land by land use class and Forest Survey Unit, Iowa, 1990

(In thousand acres)

	Forest Survey Unit			
Land use class	All Units	Northeastern Unit	Southeastern Unit	Western Unit
Forest land				
Timberland	1,943.5	706.4	946.8	290.3
Reserved forest land	87.8	23.9	54.1	9.8
Woodland	18.9	11.3	2.8	4.8
Total	2,050.2	741.6	1,003.7	304.9
Nonforest land				
Nonforest with trees				
Cropland with trees	15.4	4.7	7.9	2.8
Improved pasture with trees	117.4	25.4	68.5	23.5
Wooded strips	132.3	29.4	73.7	29.2
Idle farmland with trees	10.5	--	10.5	--
Marsh with trees	6.3	2.7	3.6	--
Urban and other with trees	44.2	19.9	21.7	2.6
Windbreaks	21.8	7.1	4.0	10.7
Wooded pasture	174.1	70.7	88.7	14.7
Subtotal	522.0	159.9	278.6	83.5
Nonforest without trees				
Cropland	28,651.7	7,261.5	8,096.1	13,294.1
Improved pasture	1,959.5	329.1	958.9	671.5
Idle farmland	5.8	--	5.8	--
Marsh	53.2	23.0	5.7	24.5
Other farm-farmstead	796.9	176.0	201.4	419.5
Urban and other	1,685.4	475.5	674.2	535.7
Noncensus water	92.3	24.8	39.9	27.6
Subtotal	33,244.8	8,289.9	9,982.0	14,972.9
All nonforest land	33,766.8	8,449.8	10,260.6	15,056.4
Total land	35,817.0	9,191.4	11,264.3	15,361.3
Water[1]	198.4	65.8	74.6	58.0
Total land and water[1]	36,015.4	9,257.2	11,338.9	15,419.3

[1] Land and water totals from the Bureau of Census, 1980.

Table 30.--Area of timberland by ownership class, potential productivity class, and Forest Survey Unit, Iowa, 1990

(In thousand acres)

Unit and ownership class	All classes	Potential productivity class (cubic feet of growth per acre per year)				
		165+	120-164	85-119	50-84	20-49
All Units						
Public	155.8	--	15.9	52.6	67.6	19.7
Farmer	1,242.1	5.1	27.8	399.8	575.5	233.9
Miscellaneous private	545.6	17.5	16.0	120.8	268.3	123.0
All owners	1,943.5	22.6	59.7	573.2	911.4	376.6
Northeastern Unit						
Public	54.1	--	12.5	17.3	21.0	3.3
Farmer	517.5	--	8.8	195.4	232.6	80.7
Miscellaneous private	134.8	3.2	8.5	37.8	55.7	29.6
All owners	706.4	3.2	29.8	250.5	309.3	113.6
Southeastern Unit						
Public	64.5	--	3.4	17.9	31.0	12.2
Farmer	549.2	2.6	19.0	174.2	263.8	89.6
Miscellaneous private	333.1	9.7	2.1	62.8	190.3	68.2
All owners	946.8	12.3	24.5	254.9	485.1	170.0
Western Unit						
Public	37.2	--	--	17.4	15.6	4.2
Farmer	175.4	2.5	--	30.2	79.1	63.6
Miscellaneous private	77.7	4.6	5.4	20.2	22.3	25.2
All owners	290.3	7.1	5.4	67.8	117.0	93.0

Table 31.--Area of privately owned timberland by ownership class, owner tenure, and size of holding, Iowa, 1990

(In thousand acres)

Ownership class and owner tenure class	All sizes	Size of holding (acres)							
		1-4	5-10	11-20	21-50	51-100	101-500	501-2,500	2,501-5,000	5,001+
Farmer										
1-4 years	284.8	10.6	26.9	30.9	101.8	98.2	13.7	2.7	--	--
5-9 years	210.5	2.8	22.5	17.9	70.8	74.2	22.3	--	--	--
10-19 years	342.7	10.0	25.1	49.7	118.2	104.9	34.8	--	--	--
20+ years	404.1	5.2	19.2	66.7	96.7	150.2	59.8	2.7	3.6	--
All classes	1,242.1	28.6	93.7	165.2	387.5	427.5	130.6	5.4	3.6	--
Miscellaneous private										
1-4 years	142.6	10.6	19.3	19.7	53.8	23.6	12.9	2.7	--	--
5-9 years	83.8	0.0	6.2	18.7	28.2	10.9	17.7	2.1	--	--
10-19 years	192.2	7.0	13.1	44.8	74.7	29.8	20.3	2.5	--	--
20+ years	123.0	3.4	15.3	6.4	24.9	23.6	30.1	2.1	2.8	14.4
All classes	541.6	21.0	53.9	89.6	181.6	87.9	81.0	9.4	2.8	14.4
All private owners										
1-4 years	427.4	21.2	46.2	50.6	155.6	121.8	26.6	5.4	--	--
5-9 years	294.3	2.8	28.7	36.6	99.0	85.1	40.0	2.1	--	--
10-19 years	534.9	17.0	38.2	94.5	192.9	134.7	55.1	2.5	--	--
20+ years	527.1	8.6	34.5	73.1	121.6	173.8	89.9	4.8	6.4	14.4
All classes	1,783.7	49.6	147.6	254.8	569.1	515.4	211.6	14.8	6.4	14.4

Table 32.--Area of timberland by ownership class, stand-volume class, and Forest Survey Unit, Iowa, 1990

(In thousand acres)

Unit and ownership class	All classes	Stand-volume class (board feet[1]) Less than 1,500	1,500 to 5,000	5,000 +
All Units				
Public	155.8	67.1	46.8	41.9
Farmer	1,242.1	547.8	522.1	172.2
Miscellaneous private	545.6	233.6	205.9	106.1
All owners	1,943.5	848.5	774.8	320.2
Northeastern Unit				
Public	54.1	28.0	13.9	12.2
Farmer	517.5	180.1	245.9	91.5
Miscellaneous private	134.8	38.0	58.9	37.9
All owners	706.4	246.1	318.7	141.6
Southeastern Unit				
Public	64.5	6.8	32.9	24.8
Farmer	549.2	269.7	213.1	66.4
Miscellaneous private	333.1	161.2	118.2	53.7
All owners	946.8	437.7	364.2	144.9
Western Unit				
Public	37.2	32.3	--	4.9
Farmer	175.4	98.0	63.1	14.3
Miscellaneous private	77.7	34.4	28.8	14.5
All owners	290.3	164.7	91.9	33.7

[1] International 1/4-inch rule.

Table 33.--Area of timberland by forest type, stand-size class, and ownership class, Iowa, 1990

(In thousand acres)

		Ownership class		
Forest type	All owners	Public	Farmer	Miscellaneous private
Eastern redcedar				
Sawtimber	8.4	--	8.4	--
Poletimber	11.4	--	2.4	9.0
Seedling-sapling	3.9	--	--	3.9
All stands	23.7	--	10.8	12.9
E. redcedar-hardwood				
Sawtimber	14.4	--	8.1	6.3
Poletimber	3.2	--	3.2	--
Seedling-sapling	6.3	--	6.3	--
All stands	23.9	--	17.6	6.3
Other softwoods				
Sawtimber	--	--	--	--
Poletimber	--	--	--	--
Seedling-sapling	6.3	6.3	--	--
All stands	6.3	6.3	--	--
White oak-red oak-hickory				
Sawtimber	487.3	36.3	305.3	145.7
Poletimber	155.2	--	103.0	52.2
Seedling-sapling	78.3	2.6	51.3	24.4
All stands	720.8	38.9	459.6	222.3
White oak				
Sawtimber	70.4	8.1	43.7	18.6
Poletimber	17.3	--	3.3	14.0
Seedling-sapling	--	--	--	--
All stands	87.7	8.1	47.0	32.6
Bur oak				
Sawtimber	64.2	2.7	56.1	5.4
Poletimber	17.8	--	7.8	10.0
Seedling-sapling	2.8	--	2.8	--
All stands	84.8	2.7	66.7	15.4
Elm-ash-soft maple				
Sawtimber	327.1	48.0	180.4	98.7
Poletimber	91.7	23.7	53.3	14.7
Seedling-sapling	54.1	2.8	35.3	16.0
All stands	472.9	74.5	269.0	129.4
Cottonwood-aspen				
Sawtimber	21.8	2.1	6.2	13.5
Poletimber	--	--	--	--
Seedling-sapling	7.3	--	7.3	--
All stands	29.1	2.1	13.5	13.5
Maple-basswood				
Sawtimber	271.1	13.6	191.4	66.1
Poletimber	90.7	4.2	83.1	3.4
Seedling-sapling	129.8	2.7	83.4	43.7
All stands	491.6	20.5	357.9	113.2
Nonstocked	2.7	2.7	--	--
All types				
Sawtimber	1,264.7	110.8	799.6	354.3
Poletimber	387.3	27.9	256.1	103.3
Seedling-sapling	288.8	14.4	186.4	88.0
Nonstocked	2.7	2.7	--	--
All stands	1,943.5	155.8	1,242.1	545.6

Table 34--Area of timberland by forest type, stand-size class, and potential productivity class, Iowa, 1990

(In thousand acres)

Unit and ownership class	All classes	Potential productivity class (cubic feet of growth per acre per year)				
		165+	120-164	85-119	50-84	20-49
Eastern redcedar						
Sawtimber	8.4	--	--	--	--	8.4
Poletimber	11.4	--	--	--	--	11.4
Seedling-sapling	3.9	--	--	--	--	3.9
All stands	23.7	--	--	--	--	23.7
E. redcedar-hardwood						
Sawtimber	14.4	--	--	2.6	10.0	1.8
Poletimber	3.2	--	--	--	--	3.2
Seedling-sapling	6.3	--	--	--	3.2	3.1
All stands	23.9	--	--	2.6	13.2	8.1
Other softwoods						
Sawtimber	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--
Seedling-sapling	6.3	--	6.3	--	--	--
All stands	6.3	--	6.3	--	--	--
White oak-red oak-hickory						
Sawtimber	487.3	6.0	9.6	155.0	261.6	55.1
Poletimber	155.2	4.6	--	40.9	84.4	25.3
Seedling-sapling	78.3	3.7	--	10.5	37.5	26.6
All stands	720.8	14.3	9.6	206.4	383.5	107.0
White oak						
Sawtimber	70.4	--	--	5.8	41.9	22.7
Poletimber	17.3	--	--	--	14.6	2.7
Seedling-sapling	--	--	--	--	--	--
All stands	87.7	--	--	5.8	56.5	25.4
Bur oak						
Sawtimber	64.2	2.6	2.7	16.9	16.7	25.3
Poletimber	17.8	--	--	--	4.1	13.7
Seedling-sapling	2.8	--	--	--	--	2.8
All stands	84.8	2.6	2.7	16.9	20.8	41.8
Elm-ash-soft maple						
Sawtimber	327.1	--	24.4	120.0	135.7	47.0
Poletimber	91.7	--	--	32.6	38.1	21.0
Seedling-sapling	54.1	--	--	22.6	18.4	13.1
All stands	472.9	--	24.4	175.2	192.2	81.1
Cottonwood-aspen						
Sawtimber	21.8	--	8.5	5.3	8.0	--
Poletimber	--	--	--	--	--	--
Seedling-sapling	7.3	--	--	4.1	3.2	--
All stands	29.1	--	8.5	9.4	11.2	--
Maple-basswood						
Sawtimber	271.1	5.7	4.3	100.7	116.3	44.1
Poletimber	90.7	--	--	30.3	49.9	10.5
Seedling-sapling	129.8	--	3.9	23.2	67.8	34.9
All stands	491.6	5.7	8.2	154.2	234.0	89.5
Nonstocked	2.7	--	--	--	2.7	--
All types						
Sawtimber	1,264.7	14.3	49.5	406.3	590.2	204.4
Poletimber	387.3	4.6	--	103.8	191.1	87.8
Seedling-sapling	288.8	3.7	10.2	60.4	130.1	84.4
Nonstocked	2.7	--	--	2.7	--	--
All stands	1,943.5	22.6	59.7	573.2	911.4	376.6

Table 35.--Area of timberland by forest type, stand-age class, and Forest Survey Unit, Iowa, 1990

(In thousand acres)

Unit and forest type	All classes	Stand-age class (years)							
		1-20	21-40	41-60	61-80	81-100	101-120	121-140	141+
All Units									
Eastern redcedar	23.7	--	6.1	10.8	6.8	--	--	--	--
E. redcedar-hardwood	23.9	6.3	3.2	6.4	5.4	2.6	--	--	--
Other softwoods	6.3	6.3	--	--	--	--	--	--	--
White-red oak-hickory	720.8	72.7	122.8	157.7	149.0	129.0	56.6	27.6	5.4
White oak	87.7	--	2.8	16.6	19.9	21.6	21.4	5.4	--
Bur oak	84.8	2.8	13.5	12.6	27.4	20.5	5.2	2.8	--
Elm-ash-cottonwood	472.9	57.4	119.2	158.7	85.9	23.9	24.2	--	3.6
Cottonwood-aspen	29.1	4.1	6.3	10.2	8.5	--	--	--	--
Maple-basswood	491.6	110.0	95.8	123.1	68.9	50.6	28.8	10.3	4.1
Nonstocked	2.7	2.7	--	--	--	--	--	--	--
All types	1,943.5	262.3	369.7	496.1	371.8	248.2	136.2	46.1	13.1
Northeastern Unit									
Eastern redcedar	9.2	--	--	2.4	6.8	--	--	--	--
E. redcedar-hardwood	11.6	6.3	--	2.7	--	2.6	--	--	--
Other softwoods	6.3	6.3	--	--	--	--	--	--	--
White-red oak-hickory	238.0	2.6	17.9	42.1	72.6	56.1	37.2	6.8	2.7
White oak	15.9	--	--	--	3.2	--	12.7	--	--
Bur oak	20.1	--	3.2	--	9.6	7.3	--	--	--
Elm-ash-cottonwood	148.2	21.7	29.3	44.2	32.4	9.5	11.1	--	--
Cottonwood-aspen	10.0	4.1	--	2.7	3.2	--	--	--	--
Maple-basswood	244.4	32.0	24.0	83.7	51.7	25.4	15.8	7.7	4.1
Nonstocked	2.7	2.7	--	--	--	--	--	--	--
All types	706.4	75.7	74.4	177.8	179.5	100.9	76.8	14.5	6.8
Southeastern Unit									
Eastern redcedar	3.9	--	3.9	--	--	--	--	--	--
E. redcedar-hardwood	7.3	--	--	3.7	3.6	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White-red oak-hickory	414.2	63.8	78.2	94.3	69.9	67.5	19.4	18.4	2.7
White oak	69.3	--	2.8	14.1	16.7	21.6	8.7	5.4	--
Bur oak	27.1	--	--	5.3	5.4	10.9	2.7	2.8	--
Elm-ash-cottonwood	227.7	32.9	46.3	85.4	39.0	10.2	10.3	--	3.6
Cottonwood-aspen	8.3	--	--	5.2	3.1	--	--	--	--
Maple-basswood	189.0	70.0	50.8	26.1	8.4	20.5	10.6	2.6	--
Nonstocked	--	--	--	--	--	--	--	--	--
All types	946.8	166.7	182.0	234.1	146.1	130.7	51.7	29.2	6.3
Western Unit									
Eastern redcedar	10.6	--	2.2	8.4	--	--	--	--	--
E. redcedar-hardwood	5.0	--	3.2	--	1.8	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White-red oak-hickory	68.6	6.3	26.7	21.3	6.5	5.4	--	2.4	--
White oak	2.5	--	--	2.5	--	--	--	--	--
Bur oak	37.6	2.8	10.3	7.3	12.4	2.3	2.5	--	--
Elm-ash-cottonwood	97.0	2.8	43.6	29.1	14.5	4.2	2.8	--	--
Cottonwood-aspen	10.8	--	6.3	2.3	2.2	--	--	--	--
Maple-basswood	58.2	8.0	21.0	13.3	8.8	4.7	2.4	--	--
Nonstocked	--	--	--	--	--	--	--	--	--
All types	290.3	19.9	113.3	84.2	46.2	16.6	7.7	2.4	--

Table 36.--Area of timberland by forest type, site-index class, and Forest Survey Unit, Iowa, 1990

(In thousand acres)

Unit and forest type	All classes	Site-index class (feet)								
		11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91+
All Units										
Eastern redcedar	23.7	--	--	0.4	13.8	2.2	2.0	5.3	--	--
E. redcedar-hardwood	23.9	--	--	--	4.9	16.4	--	--	2.6	--
Other softwoods	6.3	--	--	--	--	--	--	--	6.3	--
White oak-red oak-hickory	720.8	--	--	4.5	62.6	153.6	202.4	165.7	95.4	36.6
White oak	87.7	--	--	--	20.0	26.1	27.2	11.2	3.2	--
Bur oak	84.8	--	--	9.0	30.1	11.8	11.7	7.3	9.6	5.3
Elm-ash-soft maple	472.9	--	--	6.8	9.1	40.5	96.3	150.6	96.1	73.5
Cottonwood-aspen	29.1	--	--	--	--	--	5.3	5.9	7.2	10.7
Maple-basswood	491.6	--	--	--	26.4	66.5	154.8	134.3	90.4	19.2
Nonstocked	2.7	--	--	--	--	--	--	--	2.7	--
All types	1,943.5	--	--	20.7	166.9	317.1	499.7	480.3	313.5	145.3
Northeastern Unit										
Eastern redcedar	9.2	--	--	0.4	6.8	--	2.0	--	--	--
E. redcedar-hardwood	11.6	--	--	--	3.1	5.9	--	--	2.6	--
Other softwoods	6.3	--	--	--	--	--	--	--	6.3	--
White oak-red oak-hickory	238.0	--	--	--	12.8	46.6	56.8	65.8	43.8	12.2
White oak	15.9	--	--	--	6.3	3.2	--	3.2	3.2	--
Bur oak	20.1	--	--	--	3.2	--	--	7.3	9.6	--
Elm-ash-soft maple	148.2	--	--	4.0	--	16.6	21.9	51.5	32.2	22.0
Cottonwood-aspen	10.0	--	--	--	--	--	3.2	2.7	4.1	--
Maple-basswood	244.4	--	--	--	9.0	40.5	74.5	65.6	45.4	9.4
Nonstocked	2.7	--	--	--	--	--	--	--	2.7	--
All types	706.4	--	--	4.4	41.2	112.8	158.4	196.1	149.9	43.6
Southeastern Unit										
Eastern redcedar	3.9	--	--	--	3.9	--	--	--	--	--
E. redcedar-hardwood	7.3	--	--	--	--	7.3	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--
White oak-red oak-hickory	414.2	--	--	2.7	33.0	94.0	131.4	88.7	44.6	19.8
White oak	69.3	--	--	--	13.7	22.9	24.7	8.0	--	--
Bur oak	27.1	--	--	2.8	8.2	5.4	5.4	--	--	5.3
Elm-ash-soft maple	227.7	--	--	--	9.1	13.5	64.3	58.8	48.1	33.9
Cottonwood-aspen	8.3	--	--	--	--	--	2.1	--	3.1	3.1
Maple-basswood	189.0	--	--	--	13.2	16.0	58.6	63.4	30.5	7.3
Nonstocked	--	--	--	--	--	--	--	--	--	--
All types	946.8	--	--	5.5	81.1	159.1	286.5	218.9	126.3	69.4
Western Unit										
Eastern redcedar	10.6	--	--	--	3.1	2.2	--	5.3	--	--
E. redcedar-hardwood	5.0	--	--	--	1.8	3.2	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--	--
White oak-red oak-hickory	68.6	--	--	1.8	16.8	13.0	14.2	11.2	7.0	4.6
White oak	2.5	--	--	--	--	--	2.5	--	--	--
Bur oak	37.6	--	--	6.2	18.7	6.4	6.3	--	--	--
Elm-ash-soft maple	97.0	--	--	2.8	--	10.4	10.1	40.3	15.8	17.6
Cottonwood-aspen	10.8	--	--	--	--	--	--	3.2	--	7.6
Maple-basswood	58.2	--	--	--	4.2	10.0	21.7	5.3	14.5	2.5
Nonstocked	--	--	--	--	--	--	--	--	--	--
All types	290.3	--	--	10.8	44.6	45.2	54.8	65.3	37.3	32.3

Table 37.--Area of timberland by forest type, basal-area class, and stand-size class, Iowa, 1990

(In thousand acres)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31- 40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Eastern redcedar															
Sawtimber	8.4	--	--	--	--	--	--	3.1	--	--	5.3	--	--	--	--
Poletimber	11.4	--	--	--	--	--	--	6.8	4.2	--	--	--	0.4	--	--
Seedling and sapling	3.9	--	3.9	--	--	--	--	--	--	--	--	--	--	--	--
Total	23.7	--	3.9	--	--	--	--	9.9	4.2	--	5.3	--	0.4	--	--
E. redcedar-hardwood															
Sawtimber	14.4	--	--	--	3.6	--	1.8	--	--	--	5.3	3.7	--	--	--
Poletimber	3.2	--	--	--	--	--	--	3.2	--	--	--	--	--	--	--
Seedling and sapling	6.3	--	--	--	--	3.1	3.2	--	--	--	--	--	--	--	--
Total	23.9	--	--	--	3.6	3.1	5.0	3.2	--	--	5.3	3.7	--	--	--
Other softwoods															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Seedling and sapling	6.3	--	6.3	--	--	--	--	--	--	--	--	--	--	--	--
Total	6.3	--	6.3	--	--	--	--	--	--	--	--	--	--	--	--
White oak-red oak-hickory															
Sawtimber	487.3	--	--	0.7	--	36.1	44.2	54.4	76.9	62.9	45.8	108.0	49.2	9.1	--
Poletimber	155.2	--	--	--	--	2.1	16.8	27.3	24.4	24.5	20.3	37.1	2.7	--	--
Seedling and sapling	78.3	8.5	10.5	16.4	8.9	15.6	5.5	7.6	5.3	--	--	--	--	--	--
Total	720.8	8.5	10.5	17.1	8.9	53.8	66.5	89.3	106.6	87.4	66.1	145.1	51.9	9.1	--
White oak															
Sawtimber	70.4	--	--	--	--	2.8	--	--	16.8	6.1	8.0	28.7	2.7	5.3	--
Poletimber	17.3	--	--	--	--	--	--	--	3.3	8.0	2.7	3.3	--	--	--
Seedling and sapling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	87.7	--	--	--	--	2.8	--	--	20.1	14.1	10.7	32.0	2.7	5.3	--
Bur oak															
Sawtimber	64.2	--	--	--	--	--	--	10.4	5.9	2.7	6.1	34.0	5.1	--	--
Poletimber	17.8	--	--	--	--	--	--	--	2.5	8.9	--	6.4	--	--	--
Seedling and sapling	2.8	--	2.8	--	--	--	--	--	--	--	--	--	--	--	--
Total	84.8	--	2.8	--	--	--	--	10.4	8.4	11.6	6.1	40.4	5.1	--	--
Elm-ash-soft maple															
Sawtimber	327.1	--	--	11.8	13.4	33.7	14.3	16.8	40.0	37.0	36.3	62.1	47.7	14.0	--
Poletimber	91.7	--	--	--	2.3	11.2	12.4	8.5	9.0	21.3	6.4	17.2	--	3.4	--
Seedling and sapling	54.1	2.8	3.6	6.3	--	10.4	16.8	2.3	8.0	3.9	--	--	--	--	--
Total	472.9	2.8	3.6	18.1	15.7	55.3	43.5	27.6	57.0	62.2	42.7	79.3	47.7	17.4	--
Cottonwood-aspen															
Sawtimber	21.8	--	--	--	--	--	--	--	--	--	3.1	2.7	8.6	7.4	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Seedling and sapling	7.3	--	--	3.2	--	4.1	--	--	--	--	--	--	--	--	--
Total	29.1	--	--	3.2	--	4.1	--	--	--	--	3.1	2.7	8.6	7.4	--
Maple-basswood															
Sawtimber	271.1	--	--	--	--	17.9	37.9	34.4	38.5	50.9	16.9	39.5	27.0	5.5	2.6
Poletimber	90.7	--	--	--	--	11.9	7.3	5.2	30.6	8.4	11.7	15.6	--	--	--
Seedling and sapling	129.8	10.3	14.4	42.3	14.9	22.6	10.8	5.0	4.1	5.4	--	--	--	--	--
Total	491.6	10.3	14.4	42.3	14.9	52.4	56.0	44.6	73.2	64.7	28.6	55.1	27.0	5.5	2.6
Nonstocked	2.7	--	2.7	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	1,264.7	--	--	12.5	17.0	90.5	98.2	119.1	178.1	159.6	126.8	278.7	140.3	41.3	2.6
Poletimber	387.3	--	--	--	2.3	25.2	36.5	51.0	74.0	71.1	41.1	79.6	3.1	3.4	--
Seedling and sapling	288.8	21.6	41.5	68.2	23.8	55.8	36.3	14.9	17.4	9.3	--	--	--	--	--
Nonstocked	2.7	--	2.7	--	--	--	--	--	--	--	--	--	--	--	--
All stands	1,943.5	21.6	44.2	80.7	43.1	171.5	171.0	185.0	269.5	240.0	167.9	358.3	143.4	44.7	2.6

Table 38.--Area of timberland by stocking class based on selected stand components and Forest Survey Unit, Iowa, 1990

(In thousand acres)

	Stocking classified in terms of:		
Stocking class (percent)	All live trees	Growing-stock trees	Rough and rotten trees
All Units			
0-10	--	15.3	121.9
11-20	2.7	36.7	263.0
21-30	3.6	76.0	346.2
31-40	9.0	165.9	435.5
41-50	16.5	236.7	324.1
51-60	62.1	259.9	194.3
61-70	69.5	285.2	162.0
71-80	126.0	276.8	79.5
81-90	209.6	187.1	14.7
91-100	305.4	150.3	2.3
101-110	302.8	116.1	--
111-120	327.7	89.1	--
121-130	252.0	36.9	--
131-140	162.9	6.6	--
141-150	60.7	4.9	--
151-160	33.0	--	--
161+	--	--	--
All classes	1,943.5	1,943.5	1,943.5
Northeastern Unit			
0-10	--	4.0	59.1
11-20	2.7	12.2	93.2
21-30	--	9.3	121.4
31-40	9.0	30.1	165.0
41-50	3.0	71.6	114.5
51-60	14.6	99.9	66.3
61-70	11.5	120.8	58.2
71-80	41.1	138.3	22.5
81-90	85.9	78.3	6.2
91-100	81.2	62.1	--
101-110	118.2	18.3	--
111-120	130.2	36.5	--
121-130	112.8	21.8	--
131-140	49.5	3.2	--
141-150	25.0	--	--
151-160	21.7	--	--
161+	--	--	--
All classes	706.4	706.4	706.4
Southeastern Unit			
0-10	--	5.9	47.3
11-20	--	22.1	141.9
21-30	3.6	47.5	191.6
31-40	--	108.4	206.9
41-50	10.9	96	143.3
51-60	44.8	106.9	94.6
61-70	37.9	134	75.5
71-80	71.7	103.4	37.2
81-90	83.7	95.7	6.4
91-100	130.6	78.3	2.1
101-110	156.8	87.7	--
111-120	151.4	46	--
121-130	128.2	8.8	--
131-140	94.6	3.4	--
141-150	21.3	2.7	--
151-160	11.3	--	--
161+	--	--	--
All classes	946.8	946.8	946.8

(Table 38 continued on next page)

(Table 38 continued)

Stocking class (percent)	Stocking classified in terms of: All live trees	Growing-stock trees	Rough and rotten trees
Western Unit			
0-10	--	5.4	15.5
11-20	--	2.4	27.9
21-30	--	19.2	33.2
31-40	--	27.4	63.6
41-50	2.6	69.1	66.3
51-60	2.7	53.1	33.4
61-70	20.1	30.4	28.3
71-80	13.2	35.1	19.8
81-90	40.0	13.1	2.1
91-100	93.6	9.9	0.2
101-110	27.8	10.1	--
111-120	46.1	6.6	--
121-130	11.0	6.3	--
131-140	18.8	--	--
141-150	14.4	2.2	--
151-160	--	--	--
161+	--	--	--
All classes	290.3	290.3	290.3

Table 39.--Area of reserved forest land by ownership class and Forest Survey Unit, Iowa, 1990

(In thousand acres)

Ownership class	All Units	Forest Survey Unit Northeastern Unit	Southeastern Unit	Western Unit
Public	87.8	23.9	54.1	9.8
Farmer	--	--	--	--
Miscellaneous private	--	--	--	--
All owners	87.8	23.9	54.1	9.8

Table 40.--Area of reserved forest land by forest type and Forest Survey Unit, Iowa, 1990

(In thousand acres)

Forest type	All Units	Forest Survey Unit Northeastern Unit	Southeastern Unit	Western Unit
Eastern recedar	--	--	--	--
E. recedar-hardwood	--	--	--	--
Other softwoods	--	--	--	--
White oak-red oak-hickory	45.1	10.6	30.8	3.7
White oak	2.4	--	--	2.4
Bur oak	--	--	--	--
Elm-ash-soft maple	40.3	13.3	23.3	3.7
Cottonwood-aspen	--	--	--	--
Maple-basswood	--	--	--	--
Nonstocked	--	--	--	--
All types	87.8	23.9	54.1	9.8

Table 41.--Net volume of growing stock on timberland by species group and Forest Survey Unit, Iowa, 1974 and 1990

(In thousand cubic feet)

	All Units		Northeastern Unit		Southeastern Unit		Western Unit	
Species group	1974	1990	1974	1990	1974	1990	1974	1990
Softwoods								
Eastern redcedar	6,511	17,824	1,443	8,892	2,837	4,491	2,231	4,441
Other softwoods	100	308	100	308	--	--	--	--
Total	6,611	18,132	1,543	9,200	2,837	4,491	2,231	4,441
Hardwoods								
Select white oak	266,299	334,313	80,202	109,554	148,766	182,709	37,331	42,050
Other white oak	1,405	1,689	--	--	1,405	1,689	--	--
Select red oak	138,371	188,537	71,073	91,334	63,033	93,521	4,265	3,682
Other red oak	51,162	89,521	17,345	29,874	32,845	57,728	972	1,919
Select hickory	61,706	105,146	22,227	30,812	33,790	63,999	5,689	10,335
Other hickory	18,138	34,093	6,073	12,843	8,372	16,730	3,693	4,520
Basswood	63,820	105,761	39,459	59,070	18,999	37,674	5,362	9,017
Hard maple	45,281	47,078	39,203	39,625	6,078	7,453	--	--
Soft maple	113,219	162,653	35,333	51,925	65,502	102,589	12,384	8,139
Elm	90,372	124,688	61,332	62,868	15,382	37,847	13,658	23,973
Ash	37,407	56,365	17,861	24,414	11,559	17,635	7,987	14,316
Cottonwood	102,042	149,622	25,695	32,532	38,626	61,953	37,721	55,137
Willow	34,408	38,639	12,643	9,266	13,615	18,560	8,150	10,813
Hackberry	17,233	57,083	2,636	14,935	11,451	29,827	3,146	12,321
Aspen	14,314	18,569	13,579	17,275	735	1,294	--	--
Birch	13,867	19,263	10,476	11,653	3,391	7,610	--	--
Black cherry	10,218	19,309	7,596	13,678	2,304	4,788	318	843
Black walnut	33,417	63,115	16,906	29,022	11,451	22,441	5,060	11,652
Other hardwoods	22,116	29,437	4,867	9,131	15,477	16,146	1,772	4,160
Total	1,134,795	1,644,881	484,506	649,811	502,781	782,193	147,508	212,877
All species	1,141,406	1,663,013	486,049	659,011	505,618	786,684	149,739	217,318

Table 42.--Net volume of sawtimber on timberland by species group and Forest Survey Unit, Iowa, 1974 and 1990

(In thousand board feet) [1]

	All Units		Northeastern Unit		Southeastern Unit		Western Unit	
Species group	1974	1990	1974	1990	1974	1990	1974	1990
Softwoods								
Eastern redcedar	14,220	32,305	1,733	14,934	8,526	10,129	3,961	7,242
Other softwoods	--	938	--	938	--	--	--	--
Total	14,220	33,243	1,733	15,872	8,526	10,129	3,961	7,242
Hardwoods								
Select white oak	908,663	1,232,753	299,591	462,483	493,784	628,743	115,288	141,527
Other white oak	2,445	2,876	--	--	2,445	2,876	--	--
Select red oak	555,473	810,358	304,432	410,675	235,802	385,168	15,239	14,515
Other red oak	160,034	341,730	66,425	129,040	92,130	206,709	1,479	5,981
Select hickory	133,370	252,491	58,685	91,517	64,560	144,421	10,125	16,553
Other hickory	42,308	76,921	11,325	26,275	18,864	39,755	12,119	10,891
Basswood	225,635	407,601	145,088	220,218	56,446	146,290	24,101	41,093
Hard maple	155,964	166,547	134,937	140,226	21,027	26,321	--	--
Soft maple	373,860	580,659	107,128	184,738	220,180	365,843	46,552	30,078
Elm	230,041	262,117	157,415	157,915	32,654	65,463	39,972	38,739
Ash	106,729	162,679	55,413	78,415	27,184	42,223	24,132	42,041
Cottonwood	463,874	693,394	112,973	151,175	180,533	292,879	170,368	249,340
Willow	91,452	124,366	39,226	32,757	40,454	52,488	11,772	39,121
Hackberry	44,567	138,996	5,533	34,132	32,871	78,724	6,163	26,140
Aspen	33,539	60,576	30,761	56,399	2,778	4,177	--	--
Birch	45,316	67,365	32,993	39,052	12,323	28,313	--	--
Black cherry	24,105	52,809	20,026	43,233	4,079	8,492	--	1,084
Black walnut	94,890	220,639	47,634	100,303	33,584	83,737	13,672	36,599
Other hardwoods	55,139	80,114	9,852	24,669	42,589	41,250	2,698	14,195
Total	3,747,404	5,734,991	1,639,437	2,383,222	1,614,287	2,643,872	493,680	707,897
All species	3,761,624	5,768,234	1,641,170	2,399,094	1,622,813	2,654,001	497,641	715,139

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[1] International 1/4-inch rule.

Table 43.--Net volume of all live trees[1] on timberland by species group and diameter class, Iowa, 1990

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods											
Eastern redcedar	35,034	9,745	8,008	7,758	4,435	2,106	1,206	644	848	284	--
Other softwoods	1,398	254	414	335	--	184	--	211	--	--	--
Total	36,432	9,999	8,422	8,093	4,435	2,290	1,206	855	848	284	--
Hardwoods											
Select white oak	554,214	16,222	36,330	46,597	61,350	63,265	67,300	71,531	51,886	109,352	30,381
Other white oak	2,847	288	604	860	172	190	342	--	391	--	--
Select red oak	249,090	4,482	8,108	14,746	24,905	34,115	37,638	32,003	24,241	52,232	16,620
Other red oak	130,037	6,063	10,342	11,180	15,873	20,339	18,223	16,407	8,052	18,031	5,527
Select hickory	125,144	17,329	22,029	20,343	21,451	18,416	9,147	8,644	3,217	4,568	--
Other hickory	41,182	5,601	7,907	8,325	5,379	6,237	2,726	2,283	2,724	--	--
Basswood	154,216	5,752	10,834	15,249	23,131	17,481	22,905	20,047	12,223	21,084	5,510
Hard maple	72,640	3,280	4,288	7,574	9,117	8,972	12,386	8,244	6,148	10,577	2,054
Soft maple	251,100	7,828	13,858	20,772	24,914	28,356	25,114	24,021	21,240	55,991	29,006
Elm	193,601	34,110	34,363	34,309	35,231	21,943	11,724	8,544	5,604	7,377	--
Ash	81,594	6,831	8,535	12,176	12,789	9,122	7,283	6,057	5,601	11,689	1,511
Cottonwood	167,631	1,011	4,197	4,186	7,953	9,181	11,882	10,611	13,341	58,520	46,749
Willow	65,798	2,794	5,395	7,197	9,364	10,212	7,709	6,638	7,207	8,213	1,069
Hackberry	72,970	8,622	10,159	13,116	8,195	10,836	4,885	3,576	3,963	6,944	2,674
Aspen	22,128	1,150	1,726	4,077	5,875	4,615	3,115	877	693	--	--
Birch	24,540	1,366	2,300	2,051	2,601	5,709	4,315	2,688	760	1,700	1,050
Black cherry	35,422	4,619	6,270	5,716	7,453	4,713	3,608	1,356	442	1,164	81
Black walnut	84,631	4,114	7,073	12,972	16,216	15,797	9,457	7,381	7,284	4,337	--
Other hardwoods	142,349	14,077	19,128	24,556	23,647	17,204	12,233	7,601	9,354	10,505	4,044
Noncommercial	22,468	9,869	5,921	4,438	1,149	--	753	--	0	338	--
Total	2,493,602	155,408	219,367	270,440	316,765	306,703	272,745	238,509	184,371	382,622	146,672
All species	2,530,034	165,407	227,789	278,533	321,200	308,993	273,951	239,364	185,219	382,906	146,672

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[1] Net volume of all live trees 5 inches dbh and larger from a 1-foot stump to a 4-inch top diameter outside bark.

Table 44.--Net volume of tree species on timberland by major tree class and individual species, Iowa, 1990

	All live trees						Saw-log size trees	
Species	Total all live	Growing stock	Short-log	Rough	Rotten	Total saw-log size trees	Sawtimber	Short-log
	Thousand cubic feet					*Thousand board feet*[1]		
White pine	1,274	184	--	1,090	--	938	938	--
Balsam fir	124	124	--	--	--	--	--	--
Eastern redcedar	35,034	17,824	1,358	15,852	--	38,139	32,305	5,834
White oak	299,950	219,750	25,867	47,193	7,140	868,869	796,778	72,091
Swamp white oak	7,118	3,898	784	2,280	156	11,024	8,716	2,308
Bur oak	244,255	109,389	35,870	91,946	7,050	523,815	424,476	99,339
Chinkapin oak	2,891	1,276	58	1,557	--	2,962	2,783	179
Overcup oak	190	190	--	--	--	908	908	--
Post oak	2,657	1,499	391	645	122	3,045	1,968	1,077
Northern red oak	249,090	188,537	16,227	34,589	9,737	854,056	810,358	43,698
Northern pin oak	9,546	6,307	1,076	1,971	192	32,549	29,667	2,882
Shingle oak	23,732	14,469	1,505	7,298	460	43,196	38,567	4,629
Pin oak	12,624	9,164	1,434	1,721	305	38,623	34,452	4,171
Black oak	84,135	59,581	8,458	14,015	2,081	261,752	239,044	22,708
Shellbark hickory	1,317	928	--	389	--	2,319	2,319	--
Shagbark hickory	123,048	103,592	4,643	13,841	972	260,494	247,692	12,802
Mockernut hickory	779	626	--	153	--	2,480	2,480	--
Bitternut hickory	41,182	34,093	1,601	5,016	472	81,743	76,921	4,822
American basswood	154,216	105,761	8,608	23,941	15,906	431,071	407,601	23,470
Black maple	16,358	12,407	1,370	1,515	1,066	45,730	42,147	3,583
Sugar maple	56,282	34,671	5,988	12,074	3,549	140,029	124,400	15,629
Red maple	241	241	--	--	--	1,039	1,039	--
Silver maple	250,859	162,412	24,847	51,017	12,583	641,476	579,620	61,856
American elm	132,952	82,483	9,623	40,282	564	180,916	149,976	30,940
Siberian elm	4,875	1,303	137	3,435	--	4,023	3,587	436
Slippery elm	55,774	40,902	2,267	11,458	1,147	115,872	108,554	7,318
Black ash	1,194	784	--	410	--	1,595	1,595	--
White ash	27,543	19,990	1,359	5,373	821	59,782	55,618	4,164
Green ash	52,857	35,591	2,916	7,233	7,117	114,020	105,466	8,554
Sycamore	2,394	1,637	263	--	494	8,413	7,851	562
Eastern cottonwood	167,631	149,622	4,611	5,641	7,757	702,947	693,394	9,553
Black willow	65,798	38,639	4,208	18,785	4,166	134,211	124,366	9,845
Hackberry	72,970	57,083	3,836	11,148	903	149,825	138,996	10,829
Balsam poplar	2,697	2,246	--	251	200	11,284	11,284	--
Bigtooth aspen	12,766	11,583	399	314	470	38,721	37,735	986
Quaking aspen	6,665	4,740	--	1,925	--	11,557	11,557	--
Paper birch	3,012	2,384	--	527	101	2,722	2,722	--
River birch	21,528	16,879	968	3,436	245	67,336	64,643	2,693
Black cherry	35,422	19,309	1,831	13,470	812	57,763	52,809	4,954
Black walnut	84,631	63,115	4,319	15,912	1,285	235,503	220,639	14,864
Butternut	1,786	1,195	--	206	385	2,545	2,545	--
Boxelder	68,657	6,546	1,918	49,825	10,368	19,565	14,121	5,444
Ohio buckeye	4,261	1,045	151	2,813	252	1,459	1,026	433
Kentucky coffeetree	2,609	1,294	--	1,315	--	4,427	4,427	--
Honeylocust	36,011	11,679	3,627	19,789	916	38,687	30,441	8,246
Red mulberry	16,454	1,203	126	13,456	1,669	4,914	4,543	371
Black locust	10,177	4,838	583	2,795	1,961	16,763	15,160	1,603
Noncommercial	22,468	--	--	22,468	--	--	--	--
All species	2,530,034	1,663,013	183,227	580,370	103,424	6,271,107	5,768,234	502,873

[1] International 1/4 inch rule.

Table 45.--Net volume of noncommercial tree species on timberland by individual species, Iowa, 1990

(In thousand cubic feet)

Species	Cull volume
Hawthorn	4,241
Osage-orange	7,772
Apple	187
Eastern hophornbeam	10,054
Wild plum	214
All species	22,468

Table 46.--Net volume of growing stock on timberland by species group and forest type, Iowa, 1990

(In thousand cubic feet)

Species group	All types	Forest type									
		Eastern redcedar	Eastern redcedar-hardwood	Other softwoods	White oak-red oak-hickory	White Oak	Bur oak	Elm-ash-soft maple	Cottonwood-aspen	Maple-basswood	Non-stocked
Softwoods											
Eastern redcedar	17,824	5,110	3,865	--	2,818	--	395	1,807	--	3,829	--
Other softwoods	308	--	--	--	308	--	--	--	--	--	--
Total	18,132	5,110	3,865	--	3,126	--	395	1,807	--	3,829	--
Hardwoods											
Select white oak	334,313	508	1,077	--	154,094	84,229	56,734	11,280	--	26,391	--
Other white oak	1,689	--	--	--	535	964	190	--	--	--	--
Select red oak	188,537	--	--	--	141,798	6,257	--	4,849	441	35,192	--
Other red oak	89,521	--	148	--	75,140	6,741	339	1,307	131	5,715	--
Select hickory	105,146	1,102	762	--	79,522	7,766	2,402	1,785	--	11,807	--
Other hickory	34,093	--	--	--	23,971	847	691	1,684	--	6,900	--
Basswood	105,761	--	--	--	29,811	220	3,204	4,860	--	67,666	--
Hard maple	47,078	--	--	--	12,761	--	--	1,686	416	32,215	--
Soft maple	162,653	--	--	--	2,531	--	--	151,846	5,380	2,586	310
Elm	124,688	423	907	--	35,555	2,838	3,610	34,642	944	45,658	111
Ash	56,365	--	--	--	18,431	1,536	675	24,640	1,409	9,474	200
Cottonwood	149,622	718	179	--	11,880	--	--	73,485	54,714	8,646	--
Willow	38,639	--	--	--	482	--	222	30,510	2,705	4,720	--
Hackberry	57,083	--	--	--	11,059	--	1,507	30,463	426	13,628	--
Aspen	18,569	--	--	--	6,009	305	1,312	2,401	2,651	5,891	--
Birch	19,263	--	--	--	2,669	--	--	14,290	--	2,304	--
Black cherry	19,309	--	--	--	9,282	550	692	1,921	--	6,864	--
Black walnut	63,115	709	--	--	14,737	983	1,043	11,582	--	34,061	--
Other hardwoods	29,437	--	--	--	8,141	--	514	12,909	888	6,985	--
Total	1,644,881	3,460	3,073	--	638,408	113,236	73,135	416,140	70,105	326,703	621
All species	1,663,013	8,570	6,938	--	641,534	113,236	73,530	417,947	70,105	330,532	621

Table 47.--Net volume of sawtimber on timberland by species group and forest type, Iowa, 1990

(In thousand board feet) [1]

		Forest type									
Species group	All types	Eastern redcedar	Eastern redcedar-hardwood	Other softwoods	White oak-red oak-hickory	White Oak	Bur oak	Elm-ash-soft maple	Cottonwood-aspen	Maple-basswood	Non-stocked
Softwoods											
Eastern redcedar	32,305	8,022	5,115	--	7,208	--	745	3,184	--	8,031	--
Other softwoods	938	--	--	--	938	--	--	--	--	--	--
Total	33,243	8,022	5,115	--	8,146	--	745	3,184	--	8,031	--
Hardwoods											
Select white oak	1,232,753	2,297	5,048	--	559,916	297,495	216,070	45,041	--	106,886	--
Other white oak	2,876	--	--	--	--	1,968	908	--	--	--	--
Select red oak	810,358	--	--	--	618,956	22,333	--	20,607	2,138	146,324	--
Other red oak	341,730	--	--	--	289,015	31,503	958	4,251	--	16,003	--
Select hickory	252,491	--	1,425	--	180,128	26,209	5,612	8,029	--	31,088	--
Other hickory	76,921	--	--	--	57,330	1,008	--	6,081	--	12,502	--
Basswood	407,601	--	--	--	109,092	1,102	11,686	18,613	--	267,108	--
Hard maple	166,547	--	--	--	42,259	--	--	6,622	2,016	115,650	--
Soft maple	580,659	--	--	--	7,997	--	--	548,306	15,667	7,389	1,300
Elm	262,117	763	1,280	--	89,973	5,407	9,167	57,099	2,277	96,151	--
Ash	162,679	--	--	--	46,763	3,342	2,613	85,261	5,578	18,226	896
Cottonwood	693,394	3,430	--	--	50,003	--	--	349,754	256,785	33,422	--
Willow	124,366	--	--	--	1,281	--	--	103,405	7,391	12,289	--
Hackberry	138,996	--	--	--	22,994	--	2,937	78,075	--	34,990	--
Aspen	60,576	--	--	--	23,736	--	1,476	9,611	11,284	14,469	--
Birch	67,365	--	--	--	6,880	--	--	55,694	--	4,791	--
Black cherry	52,809	--	--	--	23,852	1,934	1,650	6,692	--	18,681	--
Black walnut	220,639	1,877	--	--	46,044	3,739	2,438	43,716	--	122,825	--
Other hardwoods	80,114	--	--	--	18,763	--	2,232	32,331	3,607	23,181	--
Total	5,734,991	8,367	7,753	--	2,194,982	396,040	257,747	1,479,188	306,743	1,081,975	2,196
All species	5,768,234	16,389	12,868	--	2,203,128	396,040	258,492	1,482,372	306,743	1,090,006	2,196

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[1] International 1/4-inch rule.

Table 48.--Net volume of growing stock on timberland by species group and ownership class, Iowa, 1990

(In thousand cubic feet)

Species group	All owners	Ownership class: Public	Farmer	Miscellaneous private
Softwoods				
Eastern redcedar	17,824	--	11,723	6,101
Other softwoods	308	--	308	--
Total	18,132	--	12,031	6,101
Hardwoods				
Select white oak	334,313	30,026	192,999	111,288
Other white oak	1,689	410	744	535
Select red oak	188,537	16,017	112,369	60,151
Other red oak	89,521	5,005	57,473	27,043
Select hickory	105,146	2,012	70,612	32,522
Other hickory	34,093	1,513	21,927	10,653
Basswood	105,761	9,275	65,819	30,667
Hard maple	47,078	4,663	30,814	11,601
Soft maple	162,653	40,399	70,688	51,342
Elm	124,688	17,465	79,138	28,085
Ash	56,365	9,002	34,952	12,411
Cottonwood	149,622	14,892	76,120	58,610
Willow	38,639	2,505	24,434	11,700
Hackberry	57,083	2,160	34,464	16,953
Aspen	18,569	1,337	10,533	6,699
Birch	19,263	352	16,385	2,526
Black cherry	19,309	737	11,976	6,596
Black walnut	63,115	3,842	46,381	11,287
Other hardwoods	29,437	2,157	18,713	8,567
Total	1,644,881	163,769	976,541	499,236
All species	1,663,013	163,769	988,572	505,337

Table 49.--Net volume of sawtimber on timberland by species group and ownership class, Iowa, 1990

(In thousand board feet)[1]

Species group	All owners	Ownership class		
		Public	Farmer	Miscellaneous private
Softwoods				
Eastern redcedar	32,305	--	21,134	11,171
Other softwoods	938	--	938	--
Total	33,243	--	22,072	11,171
Hardwoods				
Select white oak	1,232,753	123,411	742,045	367,297
Other white oak	2,876	2,016	860	--
Select red oak	810,358	75,768	471,700	262,890
Other red oak	341,730	22,179	217,739	101,812
Select hickory	252,491	6,522	165,374	80,595
Other hickory	76,921	5,806	45,692	25,423
Basswood	407,601	35,495	246,475	125,631
Hard maple	166,547	20,572	105,583	40,392
Soft maple	580,659	153,709	238,541	188,409
Elm	262,117	21,247	170,962	69,908
Ash	162,679	27,771	107,927	26,981
Cottonwood	693,394	73,701	353,835	265,858
Willow	124,366	11,404	77,630	35,332
Hackberry	138,996	2,132	82,794	40,103
Aspen	60,576	5,525	32,467	22,584
Birch	67,365	997	58,614	7,754
Black cherry	52,809	3,333	29,628	19,848
Black walnut	220,639	16,694	157,504	38,841
Other hardwoods	80,114	6,468	53,503	20,143
Total	5,734,991	614,750	3,358,873	1,739,801
All species	5,768,234	614,750	3,380,945	1,750,972

[1] International 1/4-inch rule.

Table 50.--Net volume of growing stock on timberland by forest type, stand-age class, and Forest Survey Unit, Iowa, 1990

(In thousand cubic feet)

Unit and forest type	All classes	Stand-age class (years)							
		1-20	21-40	41-60	61-80	81-100	101-120	121-140	141+
All Units									
Eastern redcedar	8,570	--	755	5,811	2,004	--	--	--	--
E. redcedar-hardwood	6,938	771	687	2,521	1,212	1,747	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White oak - red oak-hickory	641,534	14,590	81,294	150,742	157,094	149,340	55,422	23,026	10,026
White oak	113,236	--	2,809	17,273	27,356	28,108	31,768	5,922	--
Bur oak	73,530	202	4,913	13,132	27,059	20,758	6,748	718	--
Elm-ash-soft maple	417,947	21,123	68,955	191,540	86,136	33,662	13,687	--	2,844
Cottonwood-aspen	70,105	3,294	15,347	31,484	19,980	--	--	--	--
Maple-basswood	330,532	19,202	51,756	99,720	74,689	50,781	21,724	10,441	2,219
Nonstocked	621	621	--	--	--	--	--	--	--
All types	1,663,013	59,803	226,516	512,223	395,530	284,396	129,349	40,107	15,089
Northeastern Unit									
Eastern redcedar	3,461	--	--	1,457	2,004	--	--	--	--
E. redcedar-hardwood	3,505	771	--	987	--	1,747	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White oak - red oak-hickory	252,378	380	14,303	51,923	77,364	66,844	30,441	10,547	576
White oak	25,060	--	--	--	4,450	--	20,610	--	--
Bur oak	21,436	--	2,180	--	9,752	9,504	--	--	--
Elm-ash-soft maple	129,933	6,027	14,224	48,883	41,167	11,819	7,813	--	--
Cottonwood-aspen	10,315	3,294	--	6,616	405	--	--	--	--
Maple-basswood	212,302	7,792	17,385	72,439	61,606	31,722	11,303	7,836	2,219
Nonstocked	621	621	--	--	--	--	--	--	--
All types	659,011	18,885	48,092	182,305	196,748	121,636	70,167	18,383	2,795
Southeastern Unit									
Eastern redcedar	380	--	380	--	--	--	--	--	--
E. redcedar-hardwood	2,468	--	--	1,534	934	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White oak - red oak-hickory	351,778	13,809	58,919	85,358	72,237	76,967	24,981	10,057	9,450
White oak	85,399	--	2,809	14,496	22,906	28,108	11,158	5,922	--
Bur oak	26,090	--	--	7,968	3,040	9,937	4,427	718	--
Elm-ash-soft maple	213,434	14,813	33,282	107,853	31,077	18,226	5,339	0	2,844
Cottonwood-aspen	23,689	--	--	15,748	7,941	--	--	--	--
Maple-basswood	83,446	10,827	22,377	14,176	8,736	15,620	9,105	2,605	--
Nonstocked	--	--	--	--	--	--	--	--	--
All types	786,684	39,449	117,767	247,133	146,871	148,858	55,010	19,302	12,294
Western Unit									
Eastern redcedar	4,729	--	375	4,354	--	--	--	--	--
E. redcedar-hardwood	965	--	687	0	278	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White oak - red oak-hickory	37,378	401	8,072	13,461	7,493	5,529	--	2,422	--
White oak	2,777	--	--	2,777	--	--	--	--	--
Bur oak	26,004	202	2,733	5,164	14,267	1,317	2,321	--	--
Elm-ash-soft maple	74,580	283	21,449	34,804	13,892	3,617	535	--	--
Cottonwood-aspen	36,101	--	15,347	9,120	11,634	--	--	--	--
Maple-basswood	34,784	583	11,994	13,105	4,347	3,439	1,316	--	--
Nonstocked	--	--	--	--	--	--	--	--	--
All types	217,318	1,469	60,657	82,785	51,911	13,902	4,172	2,422	--

Table 51.--Net volume of sawtimber on timberland by forest type, stand-age class, and Forest Survey Unit, Iowa, 1990

(In thousand board feet) [1]

Unit and forest type	All classes	Stand-age class (years)							
		1-20	21-40	41-60	61-80	81-100	101-120	121-140	141+
All Units									
Eastern redcedar	16,389	--	683	10,162	5,544	--	--	--	--
E. redcedar-hardwood	12,868	--	--	5,238	3,374	4,256	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White oak - red oak-hickory	2,203,128	49,210	195,768	434,796	590,832	592,263	220,186	79,202	40,871
White oak	396,040	0	4,353	42,183	94,152	105,718	126,838	22,796	--
Bur oak	258,492	960	10,397	33,448	108,500	76,793	25,256	3,138	--
Elm-ash-soft maple	1,482,372	55,839	157,924	729,634	337,244	143,779	46,939	0	11,013
Cottonwood-aspen	306,743	15,438	52,597	144,705	94,003	0	0	0	--
Maple-basswood	1,090,006	49,928	118,424	314,985	264,766	198,824	86,724	45,803	10,552
Nonstocked	2,196	2,196	--	--	--	--	--	--	--
All types	5,768,234	173,571	540,146	1,715,151	1,498,415	1,121,633	505,943	150,939	62,436
Northeastern Unit									
Eastern redcedar	7,302	--	--	1,758	5,544	--	--	--	--
E. redcedar-hardwood	6,020	--	--	1,764	--	4,256	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White oak - red oak-hickory	950,674	1,109	38,364	187,746	299,672	267,478	116,711	38,382	1,212
White oak	105,940	--	--	--	20,031	--	85,909	--	--
Bur oak	84,923	--	6,758	--	41,429	36,736	--	--	--
Elm-ash-soft maple	476,261	14,354	31,793	187,170	165,160	50,212	27,572	--	--
Cottonwood-aspen	46,878	15,438	--	31,440	--	--	--	--	--
Maple-basswood	718,900	21,266	44,199	222,543	216,100	124,641	44,889	34,710	10,552
Nonstocked	2,196	2,196	--	--	--	--	--	--	--
All types	2,399,094	54,363	121,114	632,421	747,936	483,323	275,081	73,092	11,764
Southeastern Unit									
Eastern redcedar	--	--	--	--	--	--	--	--	--
E. redcedar-hardwood	6,179	--	--	3,474	2,705	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White oak - red oak-hickory	1,144,493	47,549	139,927	215,955	263,972	301,867	103,475	32,089	39,659
White oak	286,533	--	4,353	38,616	74,121	105,718	40,929	22,796	--
Bur oak	93,545	--	--	25,832	10,563	36,474	17,538	3,138	--
Elm-ash-soft maple	757,918	40,198	91,260	400,427	121,381	76,403	17,236	--	11,013
Cottonwood-aspen	102,340	--	--	66,419	35,921	--	--	--	--
Maple-basswood	262,993	28,662	46,945	43,900	35,973	60,963	35,457	11,093	--
Nonstocked	--	--	--	--	--	--	--	--	--
All types	2,654,001	116,409	282,485	794,623	544,636	581,425	214,635	69,116	50,672
Western Unit									
Eastern redcedar	9,087	--	683	8,404	--	--	--	--	--
E. redcedar-hardwood	669	--	--	--	669	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
White oak - red oak-hickory	107,961	552	17,477	31,095	27,188	22,918	--	8,731	--
White oak	3,567	--	--	3,567	--	--	--	--	--
Bur oak	80,024	960	3,639	7,616	56,508	3,583	7,718	--	--
Elm-ash-soft maple	248,193	1,287	34,871	142,037	50,703	17,164	2,131	--	--
Cottonwood-aspen	157,525	--	52,597	46,846	58,082	--	--	--	--
Maple-basswood	108,113	--	27,280	48,542	12,693	13,220	6,378	--	--
Nonstocked	--	--	--	--	--	--	--	--	--
All types	715,139	2,799	136,547	288,107	205,843	56,885	16,227	8,731	--

[1] International 1/4 inch rule

Table 52.--Net volume of growing stock on timberland by forest type, basal-area class, and stand-size class, Iowa, 1990

(In thousand cubic feet)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31- 40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Eastern redcedar															
Sawtimber	4,354	--	--	--	--	--	--	703	--	--	3,651	--	--	--	--
Poletimber	3,836	--	--	--	--	--	--	2,004	1,587	--	--	--	245	--	--
Seedling and sapling	380	--	380	--	--	--	--	--	--	--	--	--	--	--	--
Total	8,570	--	380	--	--	--	--	2,707	1,587	--	3,651	--	245	--	--
E. redcedar-hardwood															
Sawtimber	5,480	--	--	--	934	--	278	--	--	--	2,734	1,534	--	--	--
Poletimber	687	--	--	--	--	--	--	687	--	--	--	--	--	--	--
Seedling and sapling	771	--	--	--	--	366	405	--	--	--	--	--	--	--	--
Total	6,938	--	--	--	934	366	683	687	--	--	2,734	1,534	--	--	--
Other softwoods															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Seedling and sapling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
White oak-red oak-hickory															
Sawtimber	505,817	--	--	219	--	11,957	25,730	38,673	65,088	51,489	54,272	150,181	78,962	29,246	--
Poletimber	122,653	--	--	0	--	124	11,183	13,121	13,062	18,550	18,896	43,683	4,034	--	--
Seedling and sapling	13,064	--	1,557	2,789	2,782	2,260	618	772	2,286	--	--	--	--	--	--
Total	641,534	--	1,557	3,008	2,782	14,341	37,531	52,566	80,436	70,039	73,168	193,864	82,996	29,246	--
White oak															
Sawtimber	97,177	--	--	--	--	1,823	--	--	18,045	6,842	11,032	43,143	4,548	11,744	--
Poletimber	16,059	--	--	--	--	--	--	--	2,791	7,403	2,979	2,886	--	--	--
Seedling and sapling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	113,236	--	--	--	--	1,823	--	--	20,836	14,245	14,011	46,029	4,548	11,744	--
Bur oak															
Sawtimber	64,914	--	--	--	--	--	--	4,954	3,403	1,834	6,026	41,246	7,451	--	--
Poletimber	8,414	--	--	--	--	--	--	--	1,468	3,268	--	3,678	--	--	--
Seedling and sapling	202	--	202	--	--	--	--	--	--	--	--	--	--	--	--
Total	73,530	--	202	--	--	--	--	4,954	4,871	5,102	6,026	44,924	7,451	--	--
Elm-ash-soft maple															
Sawtimber	354,731	--	--	4,895	3,922	14,990	6,611	9,370	23,369	36,072	37,818	94,491	84,320	38,873	--
Poletimber	46,177	--	--	--	317	2,063	1,524	3,435	2,728	11,461	2,985	12,919	--	8,745	--
Seedling and sapling	17,039	283	--	613	--	2,003	5,026	481	4,333	4,300	--	--	--	--	--
Total	417,947	283	--	5,508	4,239	19,056	13,161	13,286	30,430	51,833	40,803	107,410	84,320	47,618	--
Cottonwood-aspen															
Sawtimber	66,406	--	--	--	--	--	--	--	--	--	6,397	6,616	26,011	27,382	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Seedling and sapling	3,699	--	--	405	--	3,294	--	--	--	--	--	--	--	--	--
Total	70,105	--	--	405	--	3,294	--	--	--	--	6,397	6,616	26,011	27,382	--
Maple-basswood															
Sawtimber	258,431	--	--	--	--	6,633	17,885	21,032	27,284	54,984	14,997	55,990	39,880	10,949	8,797
Poletimber	49,254	--	--	--	--	1,989	1,490	1,666	18,157	6,155	9,886	9,911	--	--	--
Seedling and sapling	22,847	--	500	4,202	2,937	5,549	4,373	496	2,219	2,571	--	--	--	--	--
Total	330,532	--	500	4,202	2,937	14,171	23,748	23,194	47,660	63,710	24,883	65,901	39,880	10,949	8,797
Nonstocked	621	--	621	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	1,357,310	--	--	5,114	4,856	35,403	50,504	74,732	137,189	151,221	136,927	393,201	241,172	118,194	8,797
Poletimber	247,080	--	--	--	317	4,176	14,197	20,913	39,793	46,837	34,746	73,077	4,279	8,745	--
Seedling and sapling	58,002	283	2,639	8,009	5,719	13,472	10,422	1,749	8,838	6,871	--	--	--	--	--
Nonstocked	621	--	621	--	--	--	--	--	--	--	--	--	--	--	--
All stands	1,663,013	283	3,260	13,123	10,892	53,051	75,123	97,394	185,820	204,929	171,673	466,278	245,451	126,939	8,797

Table 53.--Net volume of sawtimber on timberland by forest type, basal-area class, and stand-size class, Iowa,1990

(In thousand board feet) [1]

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31- 40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Eastern redcedar															
Sawtimber	8,404	--	--	--	--	--	--	932	--	--	7,472	--	--	--	--
Poletimber	7,985	--	--	--	--	--	--	5,544	2,094	--	--	--	347	--	--
Seedling and sapling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	16,389	--	--	--	--	--	--	6,476	2,094	--	7,472	--	347	--	--
E. redcedar-hardwood															
Sawtimber	12,868	--	--	--	2,705	--	669	--	--	--	6,020	3,474	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Seedling and sapling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	12,868	--	--	--	2,705	--	669	--	--	--	6,020	3,474	--	--	--
Other softwoods															
Sawtimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Seedling and sapling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
White oak-red oak-hickory															
Sawtimber	1,940,401	--	--	836	--	42,561	94,941	147,630	251,214	184,740	213,642	575,374	307,055	122,408	--
Poletimber	220,462	--	--	--	--	--	23,436	29,287	27,040	36,687	33,428	65,971	4,613	--	--
Seedling and sapling	42,265	--	5,997	9,706	10,660	7,613	2,139	1,173	4,977	--	--	--	--	--	--
Total	2,203,128	--	5,997	10,542	10,660	50,174	120,516	178,090	283,231	221,427	247,070	641,345	311,668	122,408	--
White oak															
Sawtimber	367,252	--	--	--	--	8,349	--	--	72,956	26,606	37,628	162,436	18,486	40,791	--
Poletimber	28,788	--	--	--	--	--	--	--	6,285	10,751	4,621	7,131	--	--	--
Seedling and sapling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	396,040	--	--	--	--	8,349	--	--	79,241	37,357	42,249	169,567	18,486	40,791	--
Bur oak															
Sawtimber	247,095	--	--	--	--	--	--	16,618	12,394	5,268	23,641	162,524	26,650	--	--
Poletimber	10,437	--	--	--	--	--	--	--	--	3,876	--	6,561	--	--	--
Seedling and sapling	960	--	960	--	--	--	--	--	--	--	--	--	--	--	--
Total	258,492	--	960	--	--	--	--	16,618	12,394	9,144	23,641	169,085	26,650	--	--
Elm-ash-soft maple															
Sawtimber	1,358,775	--	--	20,680	14,477	54,394	22,997	35,138	85,744	128,630	143,834	360,957	332,226	159,698	--
Poletimber	73,806	--	--	--	--	2,754	4,856	3,386	1,389	14,110	7,517	19,495	--	20,299	--
Seedling and sapling	49,791	1,287	--	2,229	--	4,876	13,404	0	8,089	19,906	--	--	--	--	--
Total	1,482,372	1,287	--	22,909	14,477	62,024	41,257	38,524	95,222	162,646	151,351	380,452	332,226	179,997	--
Cottonwood-aspen															
Sawtimber	291,305	--	--	--	--	--	--	--	--	--	26,797	31,440	108,567	124,501	--
Poletimber	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Seedling and sapling	15,438	--	--	--	--	15,438	--	--	--	--	--	--	--	--	--
Total	306,743	--	--	--	--	15,438	--	--	--	--	26,797	31,440	108,567	124,501	--
Maple-basswood															
Sawtimber	943,275	--	--	--	--	29,046	64,037	68,789	79,369	206,469	51,477	216,455	146,119	43,368	38,146
Poletimber	85,443	--	--	--	--	2,680	1,582	968	28,457	9,123	20,231	22,402	--	--	--
Seedling and sapling	61,288	--	1,013	10,736	8,514	17,374	8,837	--	10,552	4,262	--	--	--	--	--
Total	1,090,006	--	1,013	10,736	8,514	49,100	74,456	69,757	118,378	219,854	71,708	238,857	146,119	43,368	38,146
Nonstocked	2,196	--	2,196	--	--	--	--	--	--	--	--	--	--	--	--
All types															
Sawtimber	5,169,375	--	--	21,516	17,182	134,350	182,644	269,107	501,677	551,713	510,511	1,512,660	939,103	490,766	38,146
Poletimber	426,921	--	--	--	--	5,434	29,874	39,185	65,265	74,547	65,797	121,560	4,960	20,299	--
Seedling and sapling	169,742	1,287	7,970	22,671	19,174	45,301	24,380	1,173	23,618	24,168	--	--	--	--	--
Nonstocked	2,196	--	2,196	--	--	--	--	--	--	--	--	--	--	--	--
All stands	5,768,234	1,287	10,166	44,187	36,356	185,085	236,898	309,465	590,560	650,428	576,308	1,634,220	944,063	511,065	38,146

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[1] International 1/4 inch rule

Table 54.--Net volume of short-log trees on timberland by species group and diameter class, Iowa, 1990

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Eastern redcedar	1,358	690	159	322	187	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
Total	1,358	690	159	322	187	--	--	--	--
Hardwoods									
Select white oak	62,579	--	5,639	9,703	7,063	7,757	8,088	19,210	5,119
Other white oak	391	--	--	--	--	--	391	--	--
Select red oak	16,227	--	1,508	1,932	1,406	1,716	3,000	4,744	1,921
Other red oak	12,473	--	1,547	1,900	1,880	2,696	1,463	1,710	1,277
Select hickory	4,643	--	1,149	1,346	441	723	488	496	--
Other hickory	1,601	--	331	541	--	250	479	--	--
Basswood	8,608	--	573	1,060	812	2,104	1,470	2,589	--
Hard maple	7,358	--	582	1,979	1,869	1,260	796	872	--
Soft maple	24,648	--	1,978	2,754	2,666	3,375	2,063	5,723	6,089
Elm	12,027	--	4,010	3,346	1,753	1,816	617	431	54
Ash	4,275	--	1,151	361	765	213	199	1,586	--
Cottonwood	4,611	--	150	221	463	196	219	542	2,820
Willow	4,208	--	889	368	208	755	1,293	497	198
Hackberry	3,836	--	1,169	311	400	177	452	609	718
Aspen	399	--	--	399	--	--	--	--	--
Birch	968	--	349	210	224	--	--	185	--
Black cherry	1,831	--	570	759	198	--	--	223	81
Black walnut	4,319	--	838	1,094	1,499	410	478	--	--
Other hardwoods	6,668	--	1,921	808	1,297	--	984	879	779
Total	181,670	--	24,354	29,092	22,944	23,448	22,480	40,296	19,056
All species	183,028	690	24,513	29,414	23,131	23,448	22,480	40,296	19,056

Table 55.--Net volume of short-log trees on timberland by species group and diameter class, Iowa, 1990

(In thousand board feet) [1]

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Eastern redcedar	5,834	3,275	717	1,228	614	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
Total	5,834	3,275	717	1,228	614	--	--	--	--
Hardwoods									
Select white oak	173,917	--	17,805	29,800	21,142	22,386	22,475	49,592	10,717
Other white oak	1,077	--	--	--	--	--	1,077	--	--
Select red oak	43,698	--	4,588	5,830	4,142	4,958	8,397	12,071	3,712
Other red oak	34,390	--	5,119	6,062	5,813	7,923	4,047	4,115	1,311
Select hickory	12,802	--	3,675	4,043	1,227	1,875	1,113	869	--
Other hickory	4,822	--	1,074	1,736	--	706	1,306	--	--
Basswood	23,470	--	1,638	2,999	2,274	5,808	3,990	6,761	--
Hard maple	19,212	--	1,660	5,426	5,044	3,256	1,940	1,886	--
Soft maple	61,856	--	5,073	7,116	6,931	8,760	5,346	14,539	14,091
Elm	38,694	--	13,377	10,927	5,563	5,642	1,865	1,201	119
Ash	12,718	--	3,685	1,141	2,401	649	590	4,252	--
Cottonwood	9,553	--	329	519	1,097	482	535	1,373	5,218
Willow	9,845	--	1,945	830	491	1,791	3,071	1,213	504
Hackberry	10,829	--	3,890	999	1,287	571	1,333	1,629	1,120
Aspen	986	--	--	986	--	--	--	--	--
Birch	2,693	--	1,012	607	635	--	--	439	--
Black cherry	4,954	--	1,646	2,170	562	--	--	553	23
Black walnut	14,864	--	3,121	3,928	5,125	1,281	1,409	--	--
Other hardwoods	16,659	--	5,359	2,302	3,611	--	2,582	2,097	708
Total	497,039	--	74,996	87,421	67,345	66,088	61,076	102,590	37,523
All species	502,873	3,275	75,713	88,649	67,959	66,088	61,076	102,590	37,523

[1] International 1/4-inch rule.

Table 56.--Average net annual growth of growing stock and sawtimber on timberland by softwoods and hardwoods and Forest Survey Unit, Iowa, 1973 and 1974-1989

Forest Survey Unit	Growing stock		Sawtimber	
	1973	1974-1989	1973	1974-1989
	In thousand cubic feet		*In thousand board feet* [1]	
Northeastern Unit				
Softwoods	42	602	-391	626
Hardwoods	17,471	16,114	34,663	79,904
Total	17,513	16,716	34,272	80,530
Southeastern Unit				
Softwoods	113	136	154	397
Hardwoods	18,625	21,282	36,290	36,871
Total	18,738	21,418	36,444	37,268
Western Unit				
Softwoods	90	115	13	--
Hardwoods	4,963	5,769	9,046	10,340
Total	5,053	5,884	9,059	10,340
All Units				
Softwoods	245	853	-224	1,651
Hardwoods	41,059	43,165	79,999	195,237
Total	41,304	44,018	79,775	196,888

[1] International 1/4-inch rule.

Table 57.--Average net annual growth of growing stock on timberland by species group and ownership class, Iowa, 1974-1989

(In thousand cubic feet)

Species group	All owners	Ownership class		
		Public	Farmer	Miscellaneous private
Softwoods				
Eastern redcedar	719	--	445	274
Other softwoods	134	121	13	--
Total	853	121	458	274
Hardwoods				
Select white oak	5,535	765	2,861	1,909
Other white oak	-6	-12	-8	14
Select red oak	3,766	226	2,418	1,122
Other red oak	2,467	113	1,443	911
Select hickory	2,705	40	1,792	873
Other hickory	1,081	17	699	365
Basswood	2,417	126	1,643	648
Hard maple	709	38	436	235
Soft maple	6,360	1,717	2,993	1,650
Elm	5,187	769	3,404	1,014
Ash	1,611	179	1,013	419
Cottonwood	3,725	398	1,673	1,654
Willow	659	--	589	70
Hackberry	3,251	92	2,137	1,022
Aspen	233	-2	145	90
Birch	-139	-30	-146	37
Black cherry	709	23	373	313
Black walnut	2,257	105	1,626	526
Other hardwoods	638	128	462	48
Total	43,165	4,692	25,553	12,920
All species	44,018	4,813	26,011	13,194

Table 58.--Average net annual growth of sawtimber on timberland by species group and ownership class, Iowa, 1974-1989

(In thousand board feet) [1]

		Ownership class		
Species group	All owners	Public	Farmer	Miscellaneous private
Softwoods				
Eastern redcedar	1,591	--	1,191	400
Other softwoods	60	--	60	--
Total	1,651	--	1,251	400
Hardwoods				
Select white oak	35,928	4,153	20,476	11,299
Other white oak	63	7	56	--
Select red oak	24,630	1,986	14,932	7,712
Other red oak	12,869	778	7,540	4,551
Select hickory	9,027	178	5,956	2,893
Other hickory	2,637	81	1,230	1,326
Basswood	13,067	1,013	8,358	3,696
Hard maple	5,074	307	3,359	1,408
Soft maple	28,821	8,683	11,548	8,590
Elm	7,583	-47	5,084	2,546
Ash	5,747	622	3,854	1,271
Cottonwood	20,211	2,200	9,547	8,464
Willow	3,658	-23	3,830	-149
Hackberry	7,951	63	4,178	3,710
Aspen	2,119	267	1,141	711
Birch	786	-83	416	453
Black cherry	2,441	147	1,452	842
Black walnut	9,930	517	7,205	2,208
Other hardwoods	2,695	496	2,062	137
Total	195,237	21,345	112,224	61,668
All species	196,888	21,345	113,475	62,068

[1] International 1/4-inch rule.

Table 59.--Average net annual growth of growing stock on timberland by species group and forest type, Iowa, 1974-1989

(In thousand cubic feet)

Species group	All types	Forest type									
		Eastern redcedar	Eastern redcedar-hardwood	Other softwoods	White oak-red oak-hickory	White Oak	Bur oak	Elm-ash-soft maple	Cottonwood-aspen	Maple-basswood	Non-stocked
Softwoods											
Eastern redcedar	719	160	111	--	108	2	22	210	--	106	--
Other softwoods	134	--	--	121	13	--	--	--	--	--	--
Total	853	160	111	121	121	2	22	210	--	106	--
Hardwoods											
Select white oak	5,535	-69	25	--	2,402	1,662	811	142	5	557	--
Other white oak	-6	--	--	--	14	-20	--	--	--	--	--
Select red oak	3,766	--	--	--	2,685	79	5	160	1	836	--
Other red oak	2,467	--	15	--	2,326	-43	3	29	2	135	--
Select hickory	2,705	37	70	--	2,144	153	32	6	--	263	--
Other hickory	1,081	--	--	--	717	35	43	54	--	232	--
Basswood	2,417	--	--	--	811	13	92	213	--	1,288	--
Hard maple	709	--	--	--	169	--	--	12	17	511	--
Soft maple	6,360	--	--	--	58	--	15	5,945	268	85	-11
Elm	5,187	27	123	--	1,073	109	93	1,713	-76	2,286	-161
Ash	1,611	-7	--	--	729	70	16	681	-28	181	-31
Cottonwood	3,725	15	11	--	324	-14	--	1,689	1,477	246	-23
Willow	659	--	--	--	38	--	14	388	15	204	--
Hackberry	3,251	--	--	--	583	--	44	1,788	5	831	--
Aspen	233	--	--	--	2	19	34	7	35	136	--
Birch	-139	--	--	--	-12	--	--	-98	-49	20	--
Black cherry	709	--	--	--	367	-10	9	77	--	266	--
Black walnut	2,257	24	--	--	561	21	37	486	2	1,126	--
Other hardwoods	638	--	--	--	209	-15	-1	366	-11	90	--
Total	43,165	27	244	--	15,200	2,059	1,247	13,658	1,663	9,293	-226
All species	44,018	187	355	121	15,321	2,061	1,269	13,868	1,663	9,399	-226

Table 60.--Average net annual growth of sawtimber on timberland by species group and forest type, Iowa, 1974-1989

(In thousand board feet) [1]

		Forest type									
Species group	All types	Eastern redcedar	Eastern redcedar-hardwood	Other softwoods	White oak-red oak-hickory	White Oak	Bur oak	Elm-ash-soft maple	Cottonwood-aspen	Maple-basswood	Non-stocked
Softwoods											
Eastern redcedar	1,591	571	-7	--	681	--	57	52	--	237	--
Other softwoods	60	--	--	--	60	--	--	--	--	--	--
Total	1,651	571	-7	--	741	--	57	52	--	237	--
Hardwoods											
Select white oak	35,928	4	112	--	16,909	9,202	4,953	936	20	3,792	--
Other white oak	63	--	--	--	0	61	2	--	--	--	--
Select red oak	24,630	--	--	--	18,470	719	20	840	5	4,576	--
Other red oak	12,869	--	--	--	11,863	377	62	96	--	471	--
Select hickory	9,027	--	26	--	7,316	731	17	-1	--	938	--
Other hickory	2,637	--	--	--	1,794	65	--	254	--	524	--
Basswood	13,067	--	--	--	4,248	63	438	783	--	7,535	--
Hard maple	5,074	--	--	--	1,231	--	0	30	80	3,733	--
Soft maple	28,821	--	--	--	680	--	47	26,877	1,016	250	-49
Elm	7,583	47	-29	--	2,632	51	449	1,035	-193	3,728	-137
Ash	5,747	4	--	--	2,688	228	107	2,647	-37	112	-2
Cottonwood	20,211	77	--	--	1,951	-61	--	9,505	7,927	923	-111
Willow	3,658	--	--	--	92	--	--	2,412	274	880	--
Hackberry	7,951	--	--	--	1,564	--	64	4,316	-92	2,099	--
Aspen	2,119	--	--	--	512	--	34	382	490	701	--
Birch	786	--	--	--	284	--	--	745	-178	-65	--
Black cherry	2,441	--	--	--	1,235	7	19	324	--	856	--
Black walnut	9,930	121	--	--	1,932	126	151	1,857	8	5,735	--
Other hardwoods	2,695	--	--	--	458	--	-5	1,467	178	597	--
Total	195,237	253	109	--	75,859	11,569	6,358	54,505	9,498	37,385	-299
All species	196,888	824	102	--	76,600	11,569	6,415	54,557	9,498	37,622	-299

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[1] International 1/4-inch rule.

Table 61.--Average annual timber removals of growing stock and sawtimber on timberland by softwoods and hardwoods, Iowa, 1973 and 1974-1989

Species group	Growing stock		Sawtimber	
	1973	1974-1989	1973	1974-1989
	In thousand cubic feet		*In thousand board feet* [1]	
Softwoods	108	158	260	474
Hardwoods	50,192	23,949	162,994	89,970
All species	50,300	24,107	163,254	90,444

[1] International 1/4-inch rule.

Table 62.--Average annual mortality of growing stock and sawtimber on timberland by softwoods and hardwoods, Iowa, 1973 and 1974 -1989

Species group	Growing stock		Sawtimber	
	1973	1974-1989	1973	1974-1989
	In thousand cubic feet		*In thousand board feet* [1]	
Softwoods	50	74	99	172
Hardwoods	6,857	16,034	25,576	43,249
All species	6,907	16,108	25,675	43,421

[1] International 1/4-inch rule.

Table 63.--Average annual mortality of growing stock on timberland by species group and cause of death, Iowa, 1974-1989

(In thousand cubic feet)

		Cause of death									
Species group	All causes	No serious damage	Insects	Disease	Weather	Animals	Fire	Suppression	Other	Logging/ mechanical	Unknown
Softwoods											
Eastern redcedar	65	26	--	1	--	--	--	--	1	8	29
Other softwoods	9	--	--	--	7	--	--	--	--	--	2
Total	74	26	--	1	7	--	--	--	1	8	31
Hardwoods											
Select white oak	878	69	--	268	64	7	--	149	20	59	242
Other white oak	9	--	--	--	--	--	--	--	--	--	9
Select red oak	1,145	9	--	536	132	--	--	52	12	69	335
Other red oak	768	53	--	381	29	29	--	9	16	19	232
Select hickory	309	80	--	--	42	1	--	10	6	13	157
Other hickory	221	6	31	10	44	--	--	14	2	12	102
Basswood	450	48	--	77	87	--	--	54	4	41	139
Hard maple	69	7	--	16	22	--	--	4	--	2	18
Soft maple	1,532	128	2	108	665	25	7	44	24	36	493
Elm	5,381	1,284	72	2,397	513	61	--	138	72	48	796
Ash	616	46	--	42	124	9	--	70	31	30	264
Cottonwood	1,195	165	--	23	348	163	12	10	97	--	377
Willow	1,356	113	--	91	701	23	7	23	11	--	387
Hackberry	194	46	3	2	3	16	1	9	4	--	110
Aspen	351	31	--	162	29	--	--	18	15	--	96
Birch	784	139	--	39	170	16	--	59	19	13	329
Black cherry	103	16	--	3	14	6	--	--	20	10	34
Black walnut	168	62	--	9	38	--	--	6	1	--	52
Other hardwoods	505	103	--	145	56	4	--	12	16	13	156
Total	16,034	2,405	108	4,309	3,081	360	27	681	370	365	4,328
All species	16,108	2,431	108	4,310	3,088	360	27	681	371	373	4,359

Table 64.--Average annual mortality of sawtimber on timberland by species group and cause of death, Iowa, 1974-1989

(In thousand board feet) [1]

		Cause of death								
Species group	All causes	No serious damage	Insects	Disease	Weather	Animals	Fire	Suppression	Other	Logging/ mechanical	Unknown
Softwoods											
Eastern redcedar	172	57	--	--	--	--	--	--	--	--	115
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	172	57	--	--	--	--	--	--	--	--	115
Hardwoods											
Select white oak	1,863	183	--	761	207	--	--	3	79	79	551
Other white oak	--	--	--	--	--	--	--	--	--	--	--
Select red oak	3,993	30	--	2,193	517	--	--	--	60	--	1,193
Other red oak	2,479	104	--	1,383	10	145	--	--	78	92	667
Select hickory	1,015	275	--	--	150	--	--	--	19	--	571
Other hickory	399	--	154	--	111	--	--	--	--	--	134
Basswood	1,525	223	--	366	389	--	--	19	--	30	498
Hard maple	255	33	--	77	107	--	--	--	--	--	38
Soft maple	4,628	275	--	297	2,423	65	17	46	25	7	1,473
Elm	11,417	1,725	162	6,643	1,021	174	--	--	256	--	1,436
Ash	1,729	49	--	82	491	--	--	--	64	101	942
Cottonwood	4,709	742	--	112	1,331	688	34	--	49	--	1,753
Willow	3,880	293	--	228	1,958	88	32	--	18	--	1,263
Hackberry	413	36	--	--	13	--	5	--	11	--	348
Aspen	680	38	--	418	--	--	--	--	--	--	224
Birch	2,613	521	--	85	660	23	--	--	83	--	1,241
Black cherry	185	28	--	16	66	--	--	--	42	--	33
Black walnut	240	46	--	--	102	--	--	--	5	--	87
Other hardwoods	1,226	184	--	435	83	19	--	--	32	--	473
Total	43,249	4,785	316	13,096	9,639	1,202	88	68	821	309	12,925
All species	43,421	4,842	316	13,096	9,639	1,202	88	68	821	309	13,040

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[1] International 1/4-inch rule.

Table 65.--Current annual removals of growing stock and sawtimber on timberland by species group and item, Iowa, 1988

GROWING STOCK

Species group	All removals	All products removals	Removals for products (Item)					Logging residue	Other removals
			Sawlogs	Veneer logs	Pulpwood[1]	Fuelwood	Posts		
	Thousand cubic feet								
Softwoods									
Eastern redcedar	65	26	1	--	--	--	25	--	39
Other softwoods	2	2	2	--	--	--	--	--	--
Total	67	28	3	--	--	--	25	--	39
Hardwoods									
White oak	4,935	2,187	1,610	92	34	408	43	408	2,340
Red oak	5,648	3,507	3,210	88	51	148	10	799	1,342
Hickory	832	196	55	--	34	96	11	24	612
Basswood	560	269	222	47	--	--	--	90	201
Hard maple	615	435	419	--	15	1	--	168	12
Soft maple	3,615	983	646	131	167	39	--	286	2,346
Elm	1,087	280	146	2	--	132	--	60	747
Ash	715	329	238	--	34	57	--	97	289
Cottonwood	4,273	2,368	1,875	6	433	54	--	354	1,551
Willow	464	47	1	--	46	--	--	3	414
Hackberry	410	38	38	--	--	--	--	12	360
Aspen	119	5	3	2	--	--	--	1	113
Birch	45	11	1	--	--	10	--	--	34
Black cherry	188	40	34	1	--	5	--	13	135
Black walnut	727	467	333	134	--	--	--	56	204
Other hardwoods	433	47	10	--	--	37	--	4	382
Total	24,666	11,209	8,841	503	814	987	64	2,375	11,082
All species	24,733	11,237	8,844	503	814	987	89	2,375	11,121
SAWTIMBER									
	Thousand board feet[2]								
Softwoods									
Eastern redcedar	180	22	2	--	--	--	20	--	158
Other softwoods	8	8	8	--	--	--	--	--	--
Total	30	30	10	--	--	--	20	--	158
Hardwoods									
White oak	17,196	9,218	7,263	405	148	1,259	143	93	7,885
Red oak	20,349	15,633	14,469	383	222	503	56	193	4,523
Hickory	2,889	885	288	--	148	384	65	10	1,994
Basswood	2,137	1,354	1,146	208	--	--	--	43	740
Hard maple	2,352	2,265	2,176	--	68	21	--	87	--
Soft maple	13,639	4,881	3,375	572	728	206	--	150	8,608
Elm	3,370	1,245	759	8	--	478	--	30	2,095
Ash	2,924	1,654	1,240	--	151	263	--	52	1,218
Cottonwood	22,040	14,790	12,642	27	1,889	232	--	162	7,088
Willow	753	213	5	--	203	5	--	5	535
Hackberry	1,492	190	190	--	--	--	--	4	1,298
Aspen	428	26	16	10	--	--	--	1	401
Birch	133	48	7	--	--	41	--	--	85
Black cherry	391	227	169	3	--	55	--	5	159
Black walnut	3,399	2,631	1,638	946	--	42	5	104	664
Other hardwoods	892	250	55	--	--	190	5	3	639
Total	94,384	55,510	45,438	2,562	3,557	3,679	274	942	37,932
All species	94,572	55,540	45,448	2,562	3,557	3,679	294	942	38,090

[1] Includes particle board and wafer bolts.

[2] International 1/4-inch rule.

Table 66.--Output of timber products by product, softwoods and hardwoods, and source of material, Iowa, 1988

				Roundwood products					
		Total		Growing stock		Nongrowing stock		Plant byproducts	
Product and species group	Standard units	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Saw logs									
Softwoods	*Thousand*	18	3	18	3	--	--	--	--
Hardwoods	*board feet*[1]	64,547	10,816	46,257	8,841	18,290	1,975	--	--
Total		64,565	10,819	46,275	8,844	18,290	1,975	--	--
Veneer logs									
Softwoods	*Thousand*	--	--	--	--	--	--	--	--
Hardwoods	*board feet*[1]	2,700	522	2,596	503	104	19	--	--
Total		2,700	522	2,596	503	104	19	--	--
Pulpwood[2]									
Softwoods	*Standard*	--	--	--	--	--	--	--	--
Hardwoods	*cords*[3]	26,090	1,956	10,924	814	4,723	411	10,443	731
Total		26,090	1,956	10,924	814	4,723	411	10,443	731
Fuelwood									
Softwoods	*Standard*	628	44	--	--	614	43	14	1
Hardwoods	*cords*[3]	472,820	32,490	14,364	987	434,197	29,836	24,259	1,667
Total		473,448	32,534	14,364	987	434,811	29,879	24,273	1,668
Posts									
Softwoods		90	34	66	25	24	9	--	--
Hardwoods	*Pieces*	263	68	248	64	15	4	--	--
Total		353	102	314	89	39	13	--	--
Miscellaneous									
Softwoods	*Thousand*	--	--	--	--	--	--	--	--
Hardwoods	*cubic feet*	2,713	2,713	--	--	--	--	2,713	2,713
Total		2,713	2,713	--	--	--	--	2,713	2,713
All products									
Softwoods	*Thousand*		81		28		52		1
Hardwoods	*cubic feet*		48,565		11,209		32,245		5,111
Total			48,646		11,237		32,297		5,112

[1] International 1/4-inch rule.

[2] Includes roundwood and plant byproducts for particle board and waferboard.

[3] 128 cubic feet; includes wood, bark, and air space.

Table 67.--Output of roundwood products by product, softwoods and hardwoods, and source of material, Iowa, 1988

(In thousand cubic feet)

Product and species	All sources	Growing stock			Rough and rotten trees	Salvable dead trees	Other sources
		Total	Sawtimber	Poletimber			
Industrial products							
Saw logs							
Softwoods	3	3	2	1	--	--	--
Hardwoods	10,816	8,841	8,691	150	1,197	106	672
Total	10,819	8,844	8,693	151	1,197	106	672
Veneer logs							
Softwoods	--	--	--	--	--	--	--
Hardwoods	522	503	503	--	--	--	19
Total	522	503	503	--	--	--	19
Pulpwood[1]							
Softwoods	--	--	--	--	--	--	--
Hardwoods	1,225	814	765	49	197	5	209
Total	1,225	814	765	49	197	5	209
All industrial products							
Softwoods	3	3	2	1	--	--	--
Hardwoods	12,563	10,158	9,959	199	1,394	111	900
Total	12,566	10,161	9,961	200	1,394	111	900
Fuelwood							
Softwoods	43	--	--	--	--	8	35
Hardwoods	30,823	987	619	368	147	9,600	20,089
Total	30,866	987	619	368	147	9,608	20,124
Posts							
Softwoods	34	25	5	20	--	--	9
Hardwoods	68	64	58	6	3	--	1
Total	102	89	63	26	3	--	10
All products							
Softwoods	80	28	7	21	--	8	44
Hardwoods	43,454	11,209	10,636	573	1,544	9,711	20,990
Total	43,534	11,237	10,643	594	1,544	9,719	21,034

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[1] Includes roundwood and plant byproducts for particle board and waferboard.

Table 68.--Timber products from roundwood by species group and product, Iowa, 1988

Species group	All products	All industrial products	Industrial products						Fuelwood		Posts	
			Saw logs		Veneer logs		Pulpwood[1]					
	Thousand cubic feet	*Thousand cubic feet*	*Thousand board feet*[2]	*Thousand cubic feet*	*Thousand board feet*[2]	*Thousand cubic feet*	*Thousand cords*[3]	*Thousand cubic feet*	*Thousand pieces*	*Thousand cubic feet*	*Thousand cords*[3]	*Thousand cubic feet*
Softwoods												
Eastern redcedar	78	1	10	1	--	--	--	--	827	43	90	34
Other softwoods	2	2	8	2	--	--	--	--	--	--	--	--
Total	80	3	18	3	--	--	--	--	827	43	90	34
Hardwoods												
White oak	13,760	2,038	10,743	1,896	405	92	648	50	167,591	11,675	136	47
Red oak	8,549	3,959	21,394	3,796	383	88	972	75	66,317	4,580	54	10
Hickory	2,121	112	432	62	--	--	648	50	29,330	1,998	63	11
Basswood	350	324	1,724	277	208	47	--	--	612	26	--	--
Hard maple	897	555	3,275	534	--	--	304	21	5,238	342	--	--
Soft maple	5,079	1,207	5,077	824	572	131	3,202	252	56,253	3,872	--	--
Elm	3,478	182	1,144	180	8	2	--	--	47,882	3,296	--	--
Ash	1,030	350	1,867	300	--	--	667	50	10,500	680	--	--
Cottonwood	4,088	2,715	14,582	2,052	27	6	8,313	657	20,167	1,373	--	--
Willow	442	71	7	1	--	--	893	70	5,405	371	--	--
Hackberry	286	42	284	42	--	--	--	--	3,716	244	--	--
Aspen	6	6	24	4	10	2	--	--	--	--	--	--
Birch	840	1	10	1	--	--	--	--	12,185	839	--	--
Black cherry	267	38	252	37	3	1	--	--	3,736	229	--	--
Walnut	1,352	951	3,649	798	1,084	153	--	--	6,152	401	5	--
Other hardwoods	909	12	83	12	--	--	--	--	13,275	897	5	--
Total	43,454	12,563	64,547	10,816	2,700	522	15,647	1,225	448,359	30,823	263	68
All species	43,534	12,566	64,565	10,819	2,700	522	15,647	1,225	449,186	30,866	353	102

[1] Includes roundwood and plant byproducts for particle board and waferboard.

[2] International 1/4-inch rule.

[3] 128 cubic feet; includes wood, bark, and air space.

Table 69.--Volume of primary plant residue by use and type of residue, Iowa, 1988

(In thousand cubic feet)

	Wood residue							
	Total		Coarse[1]		Fine[2]		Bark	
Species group	Softwoods	Hardwoods	Softwoods	Hardwoods	Softwoods	Hardwoods	Softwoods	Hardwoods
Fiber products[3]	0.2	731.1	0.2	655.1	--	76.0	--	30.9
Charcoal	--	1.2	--	--	--	1.2	--	--
Industrial fuel	0.7	459.7	0.7	197.9	0.1	261.8	--	6.5
Domestic fuel	0.2	1,207.2	0.2	1,178.4	0.1	28.8	0.1	421.2
Miscellaneous[4]	0.1	2,712.9	0.1	1,293.3	0.2	1,419.6	0.3	1,445.8
Not used[5]	0.2	1,056.4	0.1	607.2	0.2	449.2	0.1	642.5
Total	1.4	6,168.5	1.3	3,931.9	0.6	2,236.6	0.5	2,546.9

[1] Suitable for chipping such as slabs, edgings, veneer cores, etc.
[2] Not suitable for chipping such as sawdust, veneer clippings, etc.
[3] For manufacture of pulp, hardboard, or roofing felt.
[4] Livestock bedding, mulch, small dimension.
[5] Includes residue burned as waste.

Table 70.--All live tree biomass yields on timberland by species group and forest type, Iowa, 1990

(In pounds per acre)

Species group	Forest type									
	Eastern redcedar	Eastern redcedar-hardwood	Other softwoods	White oak-red oak-hickory	White oak	Bur oak	Elm-ash-soft maple	Cottonwood-aspen	Maple-basswood	Non-stocked
Softwoods										
Eastern redcedar	42,991	27,713	--	847	149	1,065	691	--	1,685	--
Other softwoods	--	--	17,436	52	--	--	--	--	--	--
Total	42,991	27,713	17,436	898	149	1,065	691	--	1,685	--
Hardwoods										
Select white oak	9,774	33,930	--	36,305	119,875	138,612	4,813	--	11,599	--
Other white oak	--	--	--	217	1,529	214	--	--	--	--
Select red oak	811	4,826	--	27,242	12,964	--	1,881	1,457	10,597	--
Other red oak	--	3,969	--	16,581	10,090	1,031	753	2,740	3,160	--
Select hickory	5,811	5,116	--	16,326	12,620	4,266	657	--	3,320	--
Other hickory	2,049	652	--	4,437	1,297	1,216	798	--	2,443	--
Basswood	--	123	--	4,870	711	3,960	1,576	--	15,924	--
Hard maple	--	--	--	3,030	6	--	807	1,366	11,109	--
Soft maple	--	--	--	773	--	--	47,452	25,998	1,218	9,424
Elm	7,558	9,357	--	10,036	6,541	7,920	13,723	5,877	21,170	4,217
Ash	774	565	--	4,082	2,308	1,183	8,150	5,716	3,316	6,285
Cottonwood	2,364	654	--	1,840	--	732	14,596	152,219	2,498	--
Willow	--	--	--	237	--	216	10,104	9,963	1,910	--
Hackberry	1,096	226	--	2,457	376	2,504	9,230	2,628	3,850	--
Aspen	177	694	--	921	320	1,545	465	10,795	1,276	--
Birch	--	--	--	505	243	--	3,572	--	747	--
Black cherry	--	106	--	2,247	800	1,070	866	1,260	3,221	--
Black walnut	5,079	3,251	--	2,828	1,341	1,718	3,623	--	8,748	--
Other hardwoods	2,301	4,545	713	5,092	637	3,277	19,352	6,187	5,490	--
Noncommercial sp.	246	1,021	--	4,271	3,296	152	3,053	123	4,012	--
Total	38,038	69,035	713	144,297	174,951	169,616	145,470	226,329	115,608	19,927
All species	81,029	96,747	18,149	145,195	175,099	170,681	146,161	226,329	117,293	19,927

Table 71.--All live tree biomass on timberland by species group and forest type, Iowa, 1990

(In green tons)

		Forest type									
Species group	All types	Eastern redcedar	Eastern redcedar-hardwood	Other softwoods	White oak-red oak-hickory	White oak	Bur oak	Elm-ash-soft maple	Cottonwood-aspen	Maple-basswood	Non-stocked
Softwoods											
Eastern redcedar	1,774,937	509,438	331,168	--	305,086	6,521	45,175	163,338	--	414,211	--
Other softwoods	73,553	--	--	54,922	18,631	--	--	--	--	--	--
Total	1,848,490	509,438	331,168	54,922	323,717	6,521	45,175	163,338	--	414,211	--
Hardwoods											
Select white oak	28,728,462	115,816	405,467	--	13,084,237	5,256,508	5,877,137	1,138,142	--	2,851,155	--
Other white oak	154,251	--	--	--	78,133	67,039	9,079	--	--	--	--
Select red oak	13,524,336	9,615	57,670	--	9,817,914	568,469	--	444,842	21,195	2,604,631	--
Other red oak	7,503,938	--	47,427	--	5,975,813	442,432	43,695	177,979	39,865	776,727	--
Select hickory	7,719,695	68,856	61,134	--	5,883,974	553,402	180,892	155,354	--	816,083	--
Other hickory	2,528,560	24,277	7,792	--	1,599,036	56,868	51,542	188,626	--	600,419	--
Basswood	6,242,288	--	1,471	--	1,754,976	31,181	167,923	372,677	--	3,914,060	--
Hard maple	4,033,527	--	--	--	1,091,959	247	--	190,836	19,878	2,730,607	--
Soft maple	12,189,172	--	--	--	278,767	--	--	11,220,031	378,274	299,377	12,723
Elm	12,980,817	89,568	111,817	--	3,617,139	286,803	335,812	3,244,887	85,504	5,203,594	5,693
Ash	4,472,411	9,166	6,757	--	1,471,305	101,225	50,180	1,927,076	83,173	815,044	8,485
Cottonwood	7,009,824	28,009	7,810	--	663,121	--	31,029	3,451,124	2,214,782	613,949	--
Willow	3,097,987	--	--	--	85,393	--	9,175	2,388,977	144,956	469,486	--
Hackberry	4,190,944	12,988	2,699	--	885,603	16,485	106,156	2,182,337	38,243	946,433	--
Aspen	1,002,491	2,101	8,294	--	332,084	14,013	65,501	109,887	157,071	313,540	--
Birch	1,221,037	--	--	--	182,105	10,642	--	844,630	--	183,660	--
Black cherry	1,906,137	--	1,271	--	809,694	35,064	45,354	204,743	18,339	791,672	--
Black walnut	4,256,672	60,186	38,845	--	1,019,034	58,785	72,843	856,691	--	2,150,288	--
Other hardwoods	8,100,923	27,263	54,313	2,246	1,835,090	27,914	138,936	4,575,670	90,016	1,349,475	--
Noncommercial sp.	3,415,250	2,910	12,196	--	1,539,356	144,515	6,449	721,845	1,794	986,185	--
Total	134,278,722	450,755	824,963	2,246	52,004,733	7,671,592	7,191,703	34,396,354	3,293,090	28,416,385	26,901
All species	136,127,212	960,193	1,156,131	57,168	52,328,450	7,678,113	7,236,878	34,559,692	3,293,090	28,830,596	26,901

Table 72.--All live tree biomass on timberland by species group and tree biomass component, Iowa, 1990

(In green tons)

			Biomass component					
	All	All live	Growing-stock trees			Nongrowing-stock trees		
Species group	components	1- 5-inch trees	Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
Softwoods								
Eastern redcedar	1,774,937	508,723	53,727	431,665	137,926	50,193	462,122	130,581
Other softwoods	73,553	20,133	868	8,264	1,625	3,206	35,125	4,332
Total	1,848,490	528,856	54,595	439,929	139,551	53,399	497,247	134,913
Hardwoods								
Select white oak	28,728,462	590,259	1,004,960	11,557,332	3,306,554	738,849	9,141,272	2,389,236
Other white oak	154,251	--	6,671	58,567	20,184	4,700	49,203	14,926
Select red oak	13,524,336	138,921	499,530	7,015,733	1,916,769	198,596	3,004,993	749,794
Other red oak	7,503,938	220,641	271,079	3,374,312	983,303	150,988	1,961,706	541,909
Select hickory	7,719,695	1,018,506	346,929	3,815,623	1,267,987	76,536	909,302	284,812
Other hickory	2,528,560	458,560	103,412	1,155,406	388,667	24,863	302,076	95,576
Basswood	6,242,288	448,129	216,212	2,652,932	777,305	117,789	1,603,942	425,979
Hard maple	4,033,527	177,136	119,607	1,687,705	501,580	73,077	1,168,017	306,405
Soft maple	12,189,172	425,841	331,188	5,187,342	1,412,078	225,204	3,667,248	940,271
Elm	12,980,817	3,091,479	481,370	3,963,145	1,351,715	326,804	2,836,277	930,027
Ash	4,472,411	573,860	141,155	1,703,093	530,365	83,229	1,127,241	313,468
Cottonwood	7,009,824	83,038	309,462	4,461,133	1,061,614	55,129	870,067	169,381
Willow	3,097,987	122,571	100,460	1,085,570	322,675	95,217	1,072,145	299,349
Hackberry	4,190,944	805,911	191,756	1,733,154	551,489	66,906	649,786	191,942
Aspen	1,002,491	71,324	34,192	560,171	136,454	9,910	152,571	37,869
Birch	1,221,037	43,156	48,017	624,836	184,886	18,012	234,580	67,550
Black cherry	1,906,137	344,491	50,426	535,528	173,659	55,744	560,766	185,523
Black walnut	4,256,672	221,930	172,066	1,999,331	603,408	78,882	906,740	274,315
Other hardwoods	8,100,923	1,118,351	72,162	806,923	250,439	367,976	4,203,422	1,281,650
Noncommercial sp.	3,415,250	2,256,640	--	--	--	97,481	766,366	294,763
Total	134,278,722	12,210,744	4,500,654	53,977,836	15,741,131	2,865,892	35,187,720	9,794,745
All species	136,127,212	12,739,600	4,555,249	54,417,765	15,880,682	2,919,291	35,684,967	9,929,658

Table 73.--All live tree biomass on timberland by species group and tree biomass component, Iowa, 1990

(In thousand cubic feet)

			Biomass component					
			Growing-stock trees			Nongrowing-stock trees		
Species group	All components	All live 1- 5-inch trees	Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
Softwoods								
Eastern redcedar	83,254	23,910	2,521	20,231	6,464	2,347	21,655	6,126
Other softwoods	3,260	904	38	360	70	142	1,555	191
Total	86,514	24,814	2,559	20,591	6,534	2,489	23,210	6,317
Hardwoods								
Select white oak	989,183	20,318	34,614	397,935	113,855	25,454	314,742	82,265
Other white oak	5,311	--	231	2,014	696	163	1,694	513
Select red oak	420,331	4,316	15,521	218,056	59,568	6,183	93,387	23,300
Other red oak	232,937	6,859	8,419	104,729	30,527	4,692	60,891	16,820
Select hickory	243,528	32,209	10,943	120,322	39,989	2,410	28,673	8,982
Other hickory	85,721	15,546	3,511	39,163	13,174	851	10,238	3,238
Basswood	296,063	21,512	10,241	125,706	36,831	5,594	75,989	20,190
Hard maple	128,487	5,645	3,814	53,761	15,977	2,335	37,199	9,756
Soft maple	440,650	15,370	11,976	187,533	51,045	8,139	132,574	34,013
Elm	476,413	117,144	17,480	143,976	49,110	11,875	103,040	33,788
Ash	175,227	23,006	5,511	66,493	20,716	3,249	44,013	12,239
Cottonwood	273,974	3,248	12,104	174,351	41,489	2,164	34,000	6,618
Willow	129,678	5,167	4,205	45,431	13,500	3,985	44,866	12,524
Hackberry	160,773	30,914	7,348	66,489	21,163	2,562	24,929	7,368
Aspen	39,780	2,880	1,354	22,208	5,406	394	6,040	1,498
Birch	44,765	1,581	1,759	22,907	6,781	663	8,598	2,476
Black cherry	77,490	13,988	2,052	21,775	7,063	2,258	22,807	7,547
Black walnut	159,233	8,704	6,424	74,584	22,517	2,944	33,829	10,231
Other hardwoods	350,282	48,497	3,099	34,576	10,769	15,937	181,905	55,499
Noncommercial sp.	136,599	90,253	--	--	--	3,900	30,657	11,789
Total	4,866,425	467,157	160,606	1,922,009	560,176	105,752	1,290,071	360,654
All species	4,952,939	491,971	163,165	1,942,600	566,710	108,241	1,313,281	366,971

Table 74.--All live shrub and tree seedling biomass yields on timberland by species group and forest type, Iowa, 1990

(In pounds per acre)

Species group	Forest type Eastern redcedar	Eastern redcedar-hardwood	Other softwoods	White oak-red oak-hickory	White oak	Bur oak	Elm-ash-soft maple	Cotton-wood-aspen	Maple-basswood
Tree seedlings									
Eastern redcedar	--	320	--	15	--	-	--	--	--
Select white oak	--	33	--	1	1	1	--	--	--
Select red oak	--	--	--	2	--	280	--	--	--
Other red oak	--	1	--	15	--	--	--	--	2
Select hickory	--	9	--	12	7	1	1	--	15
Other hickory	--	--	--	15	--	1	--	1	39
Basswood	--	--	--	43	--	--	--	--	55
Hard maple	--	1	--	33	--	--	1	--	181
Soft maple	--	--	--	--	--	--	64	--	25
Elm	12	75	--	100	88	163	34	4	159
Black ash	--	--	--	--	--	--	--	--	--
White & green ash	11	--	--	38	12	--	11	3	49
Willow	--	--	--	0	--	--	185	--	--
Hackberry	--	13	--	20	1	131	3	1	52
Bigtooth aspen	--	--	--	0	--	--	--	--	--
Quaking aspen	--	--	--	5	--	--	--	1	20
Black cherry	36	12	--	40	42	51	8	--	13
Black walnut	--	--	--	5	--	--	5	--	--
Butternut	--	--	--	--	--	--	--	--	--
Other hardwoods	--	--	--	74	--	24	56	1	7
American hornbeam	--	--	--	21	--	--	--	--	17
Eastern redbud	--	--	--	--	--	--	--	--	--
Eastern hophornbeam	--	425	--	60	--	--	1	--	86
Chokecherry	--	130	--	25	--	--	1	--	89
Wild plum	--	--	--	4	--	--	--	--	11
Dogwood	--	5	--	70	7	4	34	--	48
Total tree seedlings	58	1,025	--	599	157	655	404	11	869
Tall shrubs									
Juneberry	--	--	--	1	--	--	--	--	17
Hazel	--	24	--	35	--	--	--	--	12
Prickly ash	--	24	--	118	16	717	184	2,467	81
Alder buckthorn	--	--	--	--	--	--	--	--	1
Viburnum	--	--	--	105	--	--	1	--	25
Elder	--	--	--	--	--	--	1	--	12
Sumac	--	3	--	17	6	--	--	--	41
Misc. tall shrubs	--	--	--	11	10	--	--	--	6
Total tall shrubs	--	51	--	287	32	717	186	2,467	195
Low shrubs									
Yew	--	--	--	--	--	--	--	--	--
Virginia creeper	--	101	--	48	17	32	23	6	41
Gooseberry-current	--	62	--	29	5	25	10	35	23
Raspberry-blackberry	--	10	--	9	2	85	3	5	12
Rose	--	21	--	6	7	--	--	--	1
Honeysuckle	--	--	--	1	--	--	--	--	--
Snowberry	--	7	--	2	2	1	1	--	2
Poison ivy	--	--	--	11	1	6	26	--	18
Greenbriar	--	8	--	4	2	--	10	--	5
Grape	--	17	--	2	1	6	7	7	15
Misc. low shrubs	12	--	--	12	--	13	10	7	7
Total low shrubs	12	226	--	125	36	169	91	59	125
All shrub species	70	1,302	--	1,011	225	1,541	681	2,537	1,189
Number of plots[1]	2	5	1	100	8	8	70	3	83

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[1] Number of plots by forest type from which average yields were derived.

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Reports results of the third inventory of Iowa that was completed in 1990. Highlights the results of the inventory and contains detailed tables of forest area, timber volume, growth, removals, mortality, and ownership.

KEY WORDS: Forest area, timber volume, growth, removals, mortality.

Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.

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